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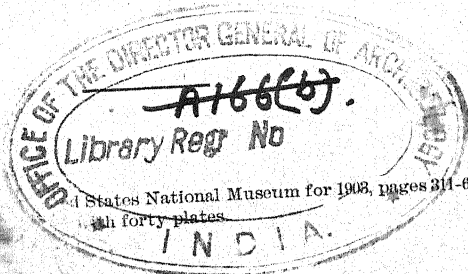
STUDIES OF THE MUSEUMS AND KINDRED
INSTITUTIONS OF NEW YORK CITY,
ALBANY, BUFFALO, AND CHICAGO,
WITH NOTES ON SOME EURO-
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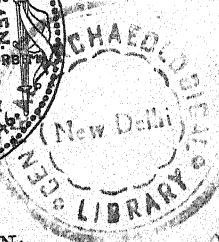
A. B. MEYER,

*Director of the Royal Zoological, Anthropological, and Ethnographical
Museum in Dresden.*



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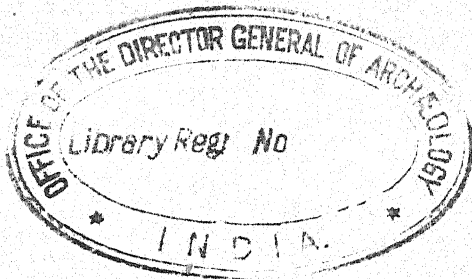
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By A. B. MEYER,

*Director of the Royal Zoological, Anthropological, and Ethnographical
Museum in Dresden.*

Translation, revised by the author, from Abhandlungen und Berichte des Königlichen Zoologischen und Anthropologisch-Ethnographischen Museums in Dresden, Band IX, 1900-1901, and Band X, 1902-1903.

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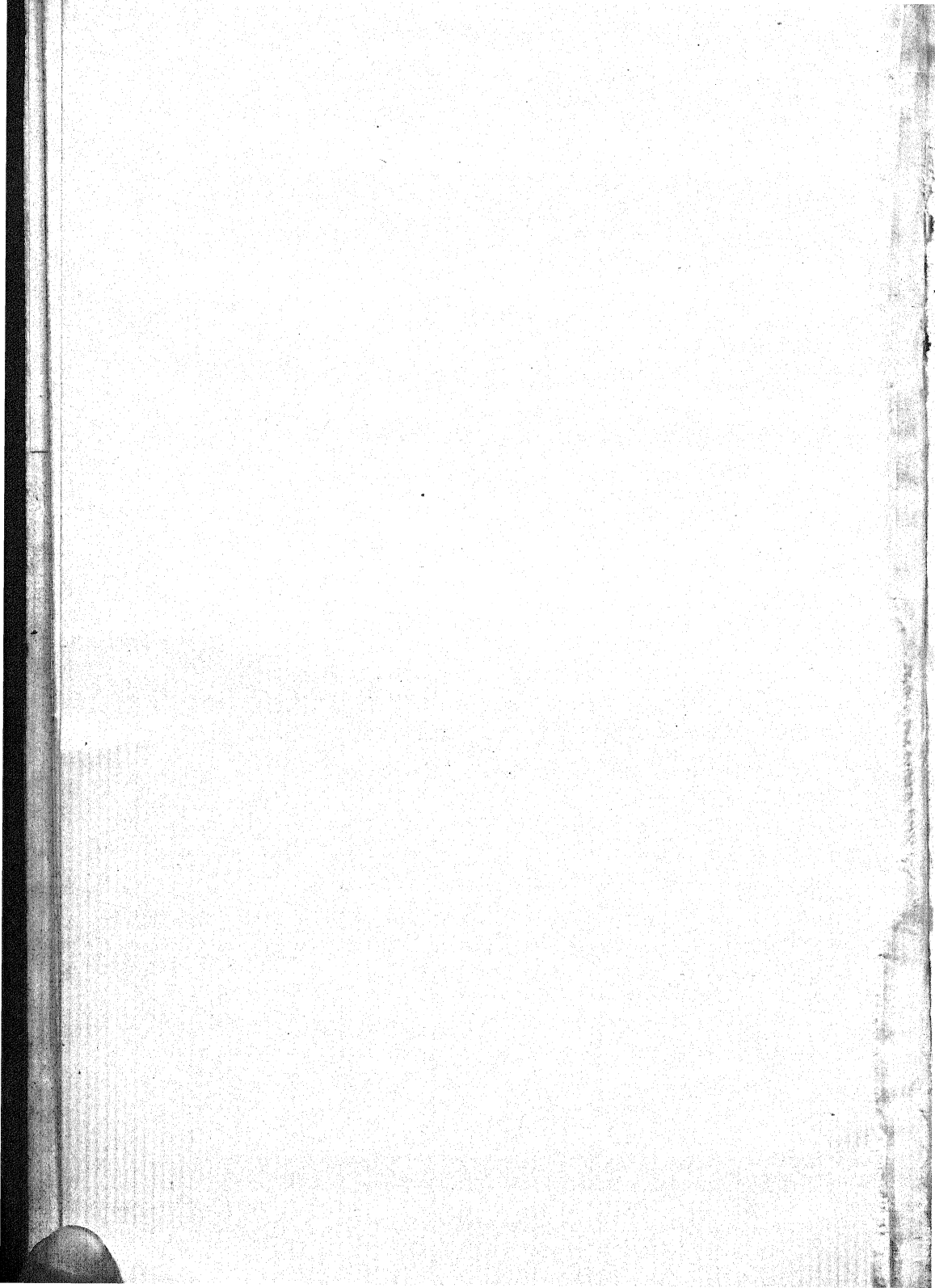
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STUDIES OF THE MUSEUMS AND KINDRED INSTITUTIONS OF NEW YORK CITY, ALBANY, BUFFALO, AND CHICAGO; NOTES ON SOME EUROPEAN INSTITUTIONS.

By A. B. MEYER,

Director of the Royal Zoological, Anthropological, and Ethnographical Museum of Dresden.

A.—MUSEUMS AND KINDRED INSTITUTIONS OF NEW YORK CITY, ALBANY, BUFFALO, AND CHICAGO.^a

INTRODUCTION.

The authorities of the Royal Collections of Art and Science in Dresden commissioned me in 1899 to visit the museums and kindred institutions of the United States so far as they relate to museum affairs, and to pay special attention to the preservation of the collections from fire. In the time at my disposal I could master only a portion of what might properly have been studied. I was moreover obliged to confine myself to the eastern part of that great country; even then I had to turn aside from a number of cities and scientific centers well worthy of study, and I was far from able to exhaust the subject even in those places that I visited. This will explain many omissions in my report. I was in New York from the 8th to the 26th of August and from the 19th to the 31st of October, in Albany from the 26th to the 29th of August, in Buffalo on the 29th and 30th of August, in Chicago from the 5th to the 13th of September, in Washington from the 14th to the 27th of September, in Philadelphia from the 27th of September to the 5th of October, and in Boston and Cambridge from the 5th to the 19th of October.

The parts of my report here presented include studies in New York City, Albany, Buffalo, and Chicago, and it is intended that other parts shall be printed as soon as possible, giving results of my studies in Washington, Philadelphia, Boston, and Cambridge.

In the United States a sharp distinction can not always be made between museums and libraries, since many of the latter also include

^a Translation of *Über Museen des Ostens der Vereinigten Staaten von Amerika. Reisestudien von Dr. A. B. Meyer.* Verlag von R. Friedländer & Sohn in Berlin, 1900 and 1901. Part I, New York State; Part II, Chicago.

collections of art and science; but apart from this the libraries have in general already attained a higher degree of development than the museums, and for that reason I was the less able to pass them by. All things considered, the American libraries perhaps excel those of Europe in architecture and in administration methods, whereas this is not yet so decidedly the case with the museums. As both the libraries and the museums of the United States are almost unknown to us, I have assumed this lack of acquaintance in my report. However great the ignorance of Americans regarding Germany may be, it is at all events exceeded by the ignorance of the Germans regarding the United States. Although year after year more than a thousand young Americans study in German schools and thousands of men and women of the educated classes of the Union annually visit the "Fatherland," as Germany is affectionately called, proportionately few educated Germans go to the United States merely for the purpose of becoming acquainted with that country, with the exception of those who go to America to recuperate in the sharp atmosphere which stirs there.

Although German colleagues who had visited American museums and Americans who came to Germany told me that "we had not much to learn there," still the authoritative opinions of men like Zittel, Ball, and Wallace indicated otherwise. In 1883 the well-known paleontologist of Munich expressed the opinion that the Americans had begun to make their natural history treasures accessible to the public and to specialists in a manner worthy in many respects of admiration and imitation. In 1885 the late director of the Science and Art Museums in Dublin was particularly impressed with the methodical planning, thoroughness, and order prevailing in the majority of the American museums. Many, though of recent date, already displayed an astounding development of strength, and the American people were looking forward with great and joyful hopes to a giant increase of their spheres of usefulness. Finally the distinguished English naturalist declared, in 1887, that the Museum of Comparative Zoology of Harvard University, in Cambridge, Massachusetts, widely known as the Agassiz Museum, far excelled all European museums as an educational institution for the public, for students, and for the special investigator. That, however, was half a generation ago, a period which in America counts for as much as half a century or more with us; in fact, during the last twenty years many imposing libraries and museums have been established in the United States. New York, above all, shows the evident tendency to become the "first city of the world." It will at all events become the greatest by its natural power of expansion and its location. The ardent desire of everyone's local patriotism is to accomplish the best, and I believe that this aim will in time be attained. We Europeans must, each in his place, exert all our strength to avoid being outstripped. The other great cities of the eastern part of the United

States which were all I was able to visit, likewise offered material beyond my expectation in the field of my studies.

I was considerably impressed with the capacity of Americans in this department, and am inclined to maintain that museum affairs in general are on a higher plane than in Europe. This is irrespective of material, and refers more to scientific than to art institutions. So far as the buildings and administrative affairs are concerned, Europeans have few good and many ordinary and even bad museums. The Americans, on the other hand (I speak only of the eastern part of the country visited by me), have many more good and fewer ordinary or bad museums. These inferior museums, however, improve rapidly, corresponding to the pace maintained in that country, whereas in Europe the rate of improvement is hopelessly slow.

The unparalleled rapid development of affairs in the United States as compared with the Old World repels a critical method of examination by the observer, not only because what has been accomplished is in a high degree worthy of respect and admiration, nay, is often even overwhelming, but also because such criticism would, in many cases, be forestalled by changed conditions, so that the critic in judging the rapidly changing conditions must keep in mind the future not less than the present, and must even regard the projected as already accomplished. I therefore confine myself in the main portion of my report more to making conspicuous the positive, the instructive, and what is new to us, and relegate any critical remarks to footnotes, in order not to mar the general impression of my statements. With regard to these criticisms, I must guard against referring to European or even Dresden museums as if things were better in these. On the contrary, things are generally not done as well on this side of the "pond," as the Americans call the Atlantic Ocean. I should, therefore, have preferred to suppress such remarks entirely, but where there is light there are generally shadows also, and, honor to truth, I promised American friends and colleagues not to do so. It was thought that something might be gained here and there by criticism. But, although this may not come to pass, I wished to show my gratitude, in some measure at least, since the reception accorded me by all those interested in similar subjects with whom I had the pleasure of becoming closely acquainted was so obliging and overcoming that I can hardly express my feelings in words. There are no men more ready to help or more amiable than the learned citizens of the Union, and I hope that they will regard my report only as a "tribute of admiration and gratitude."

EFFORTS OF THE AMERICAN NATURAL HISTORY MUSEUMS TO INCREASE THEIR USEFULNESS.^a

[The following observations, written by Doctor Meyer since the above introduction to the present work was printed, are added as of interest herein.]

There are in the United States 8,000 public libraries containing 50,000,000 volumes. Sixty of these libraries contain over 100,000 volumes each, and four of them have 500,000 each.^b The increase in the number of public museums does not keep pace with this amazing increase in the number of libraries, although it has often been recommended that a small popular museum be attached to each public library.^c There are 350 public museums, of which 250 are natural history museums.^d Germany has perhaps 500 or more, among them 150 natural history museums.^e Of the latter, France has 300,^f and Great Britain 250.^g Of the 250 natural history museums in the United States, 175 belong to schools and universities, 30 to learned societies, 30 are State museums, and 15 are maintained by private individuals or are supported by municipal funds. The State of New York, with 7,000,000 inhabitants, has thirty-one natural history museums; Pennsylvania with 6,000,000, nineteen; Massachusetts with 3,000,000, seventeen; Illinois with 5,000,000, fifteen; Ohio with 4,000,000, fourteen; California with 1,500,000, ten;^d etc. The natural history museums, therefore, by virtue of their number, already play an important part not only as scientific museums, but also as a means of popular education, when we consider the efforts being made to serve the entire community. This will be evident from the following brief account:

Exhibition collections.—As far back as 1860, L. Agassiz, perhaps

^aTranslated from A. B. Meyer: Das Bestreben der amerikanischen naturwissenschaftlichen Museen, breiten Schichten des Volks zu dienen. (Verbesserte Sonderabdruck aus: Die Museen als Volksbildungsstätten. Berlin, 1904, pp. 93-96.

^bReport of the Commissioner of Education, 1899-1900, Washington, I, 1901, p. 923; E. I. Antrim, The latest Stage of Library Development, *Forum*, 1901, XXXI, p. 337.

^cSee B. W. S. Jevons, *Methods of Social Reform*, London, 1883, p. 77, and E. S. Morse, If public Libraries, why not public Museums? Report U. S. National Museum, 1893, pp. 769-780, Washington, 1895. Also W. J. Conklin, The Union of Library and Museum, *Public Libraries*, VIII, 1903, pp. 3-8; E. W. Gaillard, The Beginning of Museum Work in Libraries, *ib.*, *idem*, pp. 9-11, and A. H. Hopkins, The Link between Library and Museum, *ib.*, *idem*, pp. 13-15.

^dA complete list is contained in A. G. Meyer, *Science*, new ser., XVII, p. 843, New York, 1903. F. J. H. Merrill, Natural History Museums of the United States and Canada; New York State Museum Bulletin No. 62, 1903. This list names 242.

^eForrer and Fischer, *Adressbuch der Museen u. s. w.* 1897; *Jahrbuch der bildenden Kunst*, 1903; Friedländers *Zoologisches Adressbuch*, 2 volumes, 1895 and 1901; R. Mielke, *Museen und Sammlungen*, Anhang, 1903, and others.

^f*Annuaire des Musees scientifiques et archeologiques*, Paris, 1900.

^gThe Report of the British Association, Manchester (1887), London, 1888, pp. 97-130. Herein are listed 211 museums, of which 190 are natural history institutions.

the first to carefully consider such a plan,^a had developed the principles on which he meant to separate an exhibition collection for visitors from a scientific collection for investigators in the museum of comparative zoology, which he was to establish at Cambridge in the United States. He actually carried out these plans a few years later. It was a long time before his ideas were adopted in Europe; but all new museums in the United States, at least, were similarly arranged from that time. In 1881 the U. S. National Museum at Washington adopted as of prime importance the general principle "to place no object on exhibition which had not some special educational value and which was not capable of attracting and instructing a large proportion of the visitors."^b The U. S. National Museum, therefore, definitely adopted the principles which subsequently determined to a greater or lesser degree the mode of operation of all natural history museums in the United States. Consequently, the visitor to a museum is not tormented with endless series of like or similar objects, and he need not himself laboriously pick out from an excess of material the objects which are to him comprehensible, instructive, or entertaining. They are placed before him without any annoying and tiresome labor on his part. The carrying out of this principle, essential to an exhibition collection, is in general made easy for the American museums by the circumstance that means are willingly furnished them for the purpose. Every month at the New York Natural History Museum they place on exhibition those migratory birds which occur in the vicinity at that particular time. This fact is mentioned as a characteristic example of the way in which museum authorities strive to incite the public to a direct observation of nature. A. R. Wallace, the well-known English naturalist, as far back as 1869, described how a public museum for the people should be constituted;^c but such an attempt, or even one approximating it, has not yet been made anywhere, though much has been said and written on the subject.

Departments for children.—In the large museums, a section may generally be found specially adapted to the comprehension of children. All, or nearly all, large libraries also have sections for children; thus, for example, the Brooklyn Museum of Arts and Sciences,^d whose children's department was visited in the year 1902 by more than 84,000 children. This children's museum publishes a small illustrated

^a Bibliothèque universelle et Revue suisse, 47 année, nouv. pér. XIV, 1862, pp. 527-40.

^b Proceedings of the U. S. National Museum, IV (1881), Washington, 1882. Appendix No. 16.

^c A. R. Wallace, Museums for the People, *Macmillan's Magazine*, London, 1869, pp. 7.

^d See my American Museum Notes, I, pp. 9 and 58 (with illustrations), in *Abhandlungen und Berichte des Dresdner Museums*. Also A Preliminary Account of the Children's Museum, Bedford Park, opened December 16, 1899, Brooklyn, N. Y., 11 pp., 2 figs., and H. P. Shepstone, A Children's Museum, *The Quiver*, London, 1901, pp. 1182-86, with figures.

monthly magazine, the Children's Museum Bulletin, in which may be found much elementary instruction. Instructive lectures, illustrated by objects from the collections, are also given there for young teachers of both sexes. The children's library contains about 3,000 titles. Similarly in the National Museum in Washington. This Museum is under the direction of the celebrated Smithsonian Institution, which was founded in 1846 "for the increase and diffusion of knowledge among men," not alone, like our academies, for the advancement of "science" in its more restricted sense. The Smithsonian Institution is the most renowned scientific institution in the United States. Its director, the noted physicist and astronomer, S. P. Langley, though not specially occupied with museum affairs, took personal charge of the establishment of this children's room in the great Museum and worked out the details with loving care. All labels are worded in such a way as to be readily understood by children. The object was to develop the minds of the children and inspire them with a love for nature, as had been proposed by Agassiz. This, it was thought, could best be accomplished by withholding from them the confused mass of objects to be found in a scientific collection, so that they might be attracted and interested, but not oppressed and repelled. Langley has admirably expressed himself upon this subject and with the humor characteristic of Americans.^a

Prizes for school children.—Direct efforts are made to induce pupils of both sexes to visit the museums by offering prizes for essays adapted to the different classes. This custom has been carried on especially at the Carnegie Museum, Pittsburg, since 1896. The report on the subject for the year 1902 occupies 41 pages.^b At the last competition 47 prizes of from five to twenty-five dollars were offered. The subjects proposed were (1) bird life, as illustrated in the museum; (2) minerals and gemstones in the museum; (3) why I like the Carnegie Museum. No composition was to exceed 1,200 words in length. The contest lasted four weeks. Even the teachers whose pupils show the best training are suitably rewarded. Last year 813 children took part in the contest. The award of prizes is always made the occasion for a great popular gathering and resembles a kind of public jubilee. The best two essays on bird life are printed in the above-named report. They were submitted by boys 13 and 17 years of age. That of the younger boy is particularly well done.

Lectures.—Great influence is exerted by public lectures. Two striking examples of this may be given. The American Museum of

^aThe Children's Room in the Smithsonian Institution. By A. B. Paine, Smithsonian Report for 1901, pp. 553-560, pls 1-xx, Washington, 1902. See also *St. Nicholas*, New York and London, September, 1901, pp. 963-73, with figures.

^bSee The Carnegie Museum, Pittsburg. Prize Essay Contest, 1901. Publications of the Carnegie Museum, Serial Nos. 13 and 19, Pittsburg, 1901 and 1902.

Natural History in New York is divided into 12 departments. The department of public instruction stands at the head of the list, a circumstance which indicates the main object of the museum. The director of this department constantly keeps in stock, so to speak, 400 lectures on 200 different subjects. One series is especially prepared for teachers, another for the general public, a third for members of the museum and their families. A person may become a member by the annual payment of \$10. In the year 1902, 90 lectures were delivered before 27,000 persons.^a The Institute of Arts and Sciences in Brooklyn holds annually more than 4,000 meetings with lectures, exhibitions, and instruction for more than 250,000 persons.^b A considerable part of these lectures and exhibitions devolves upon the museum of the institute which is established upon a very large scale. It would be a mistake to suppose that upon this account the scientific affairs of the above-named museums are neglected. These are more in the hands of other officials.

Popular publications.—Many museums publish guides and pamphlets on various subjects. In this respect again, the American Museum of Natural History in New York takes the lead. We may recall, for example, guides to the collection of birds, guides to the geological and paleontological collection; also, a quarterly museum journal, in which all news relating to the museum is published in popular form; and, finally, pamphlets such as *The Butterflies of New York and Vicinity*, *The North American Ruminants*, *The Collection of Minerals*, and many others. All are profusely illustrated and thousands of copies are sold at moderate prices.

Lending of collections.—In different museums, collections are lent to public schools for educational purposes. For example, in the New York Natural History Museum a large number of such collections of 50, 100, or more specimens each are laid aside and lent for varying periods to the schools which apply for them. This is also done by the New York State Museum at Albany and others. In the first-named museum, school children with their teachers are allowed to study more carefully certain reserve collections and even to handle the specimens. Exceptional ability is, of course, required for the administration of such establishments, but the American citizen now demands that the museums make themselves useful in as many ways as possible, and continually provide some incentive to observation and study.

Time of opening.—The American museums are almost universally open daily from morning till evening, free of charge. On the other hand, the number of custodians is small as compared with European museums. The citizen of the United States rarely steals public prop-

^a Annual Report, American Museum of Natural History, New York, 1902, p. 28.

^b See my *American Museum Reports*, I, p. 9, loc. cit.

erty, since he regards it as belonging to him personally; whereas here in Germany, the authorities as proprietors antagonize the visitor, who is treated more or less as an intruder, and departs himself in an unassuming manner.

From the foregoing it will be seen that the Americans assign a leading part in the activity of their museums to the exhibition collections, which they arrange for wide circles of the educated, half-educated, and uneducated classes. At the same time, they foster the interests even of little children, and try to stimulate the older ones by offering prizes; they make the museums contribute directly to the cause of education by series of lectures, by popular publications, and by lending collections; and they keep the doors of their museums open to everybody from morning till evening. How far all this could be adapted to German conditions is a question which ought to be discussed in a separate article.

I.—THE CITY OF NEW YORK.

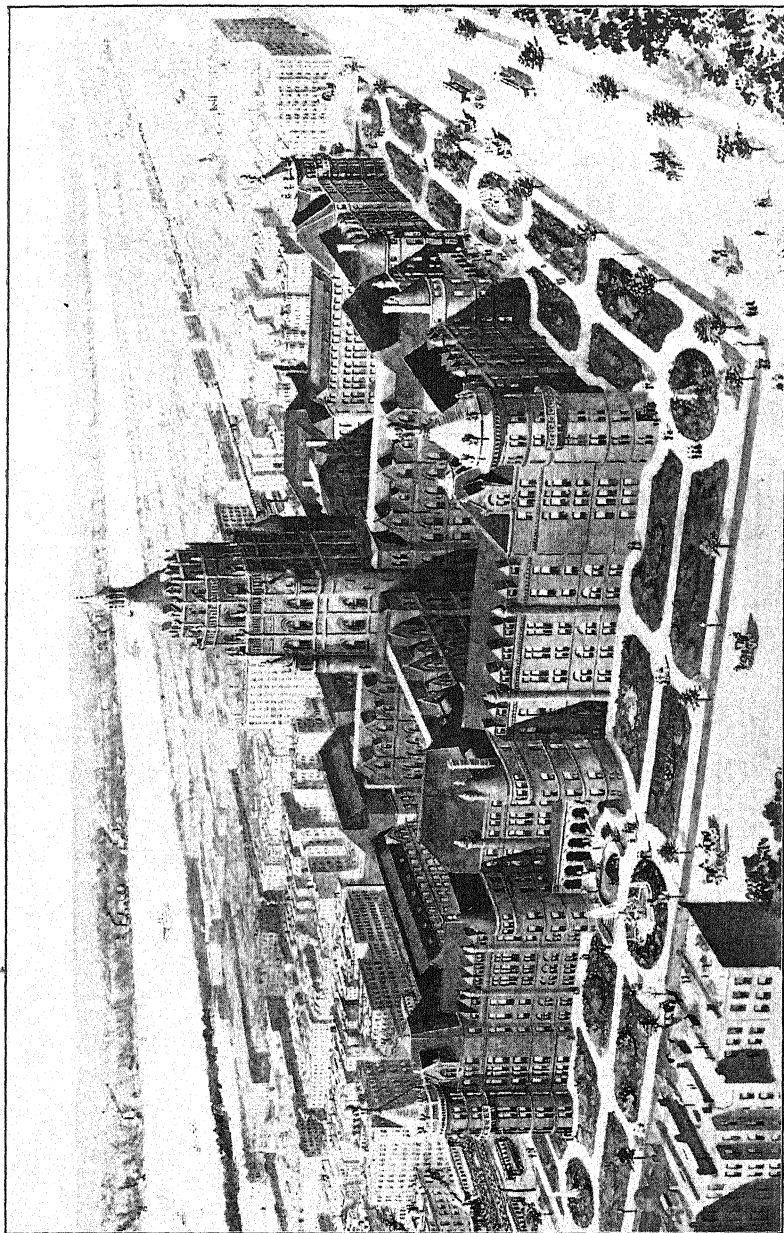
[Population 3,440,000, or, including its surroundings, 4,000,000 inhabitants.]

1. AMERICAN MUSEUM OF NATURAL HISTORY.

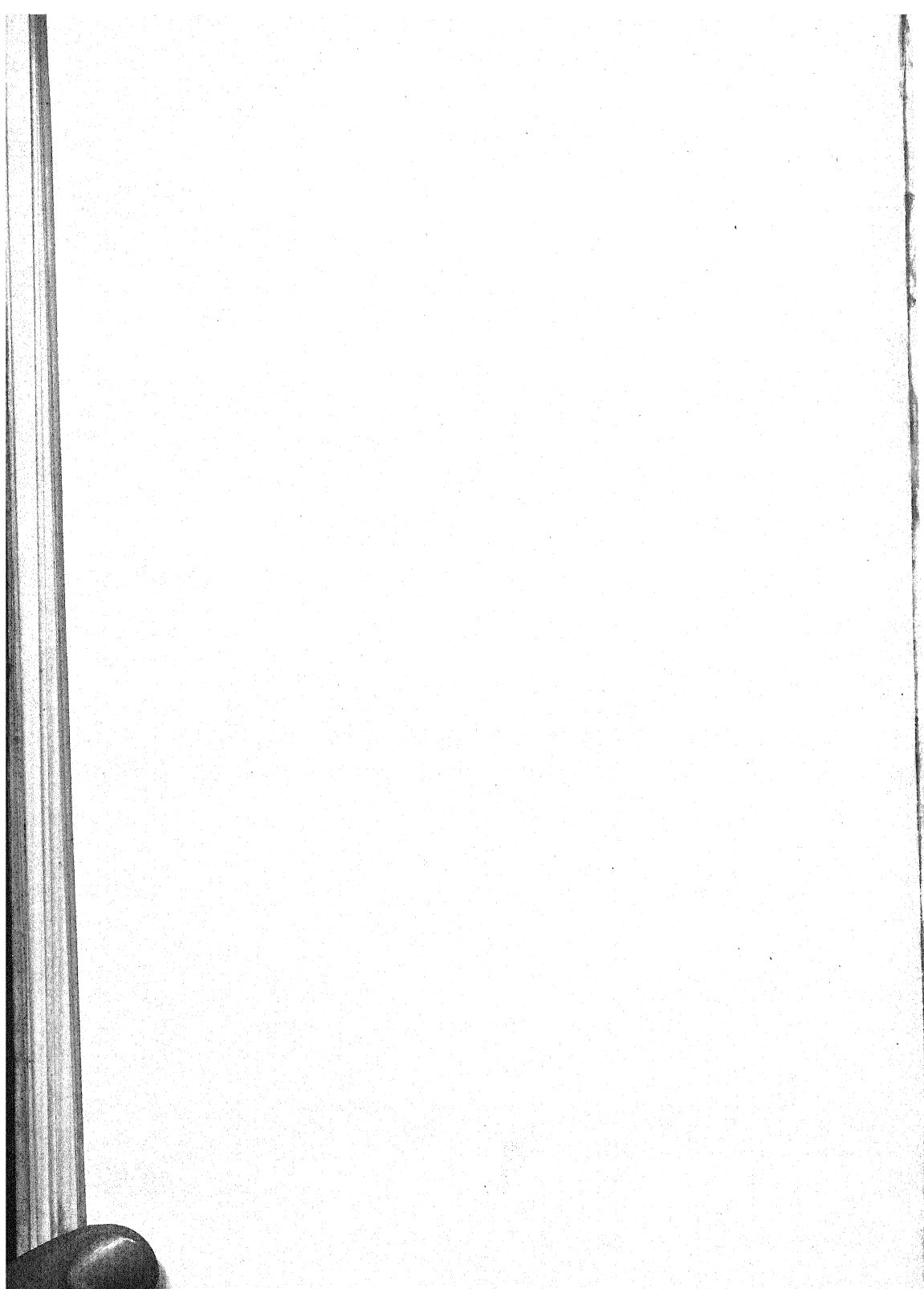
In comparison with other cities of the Union, New York was very slow in organizing a natural history museum, but when, in the year 1869, it was decided to establish one, a project on the grandest scale of all was adopted and collecting was immediately begun in a comprehensive way.

The building occupies a detached position alongside of Central Park near great business streets, and has a richly molded façade of red brick, syenite, and granite, with towers, jutties, balconies, roofs, etc., in modern Romanesque style, approaching the French castle type, which was introduced into England some decades ago. This style has flourished in the United States chiefly through the influence of the architect Richardson. The museum serves for anthropology, ethnography, archeology, zoology, paleontology, geology, mineralogy, and botany. The architects were, and still are, Vaux, Cady, Berg, and See. The inner building, 183 feet long, 65 feet wide, and 101 feet high, the first to be completed, was occupied in 1877. The existing collections were in the meantime accommodated in the old arsenal in Central Park. The height of the first floor is 18 feet; the second and third floors are together 30 feet, consisting in reality of only one floor and a gallery, the latter with a separate row of windows; the fourth floor 22 feet; and the fifth, 16 feet. The dimensions of the halls are 85 by 85, 155 by 75, 172 by 90, and 183 by 65 feet. In America they still reckon by feet, equal to 0.305 meter.

About one-sixth of the projected building is now erect. The entire building when completed, which may not be for generations,



AMERICAN MUSEUM OF NATURAL HISTORY.
General view of the completed building as planned.



will occupy 13 acres,^a and will form a quadrangle with four courts, each 213 feet square. A dome-like central tower 300 feet high is also planned.^b The south side of this quadrangle, 750 feet long and 75 to 90 feet wide, was completed in 1899, in addition to the previously built south arm of the central cross and the ground floor of the central building, as mentioned, and forms a palace six to seven stories high, including cellar and ground floor—from cellar to roof 127 feet high—which has already cost, together with furniture, \$2,800,000,^c and affords 148,000 square feet of exhibition space. The building and furniture are paid for by the city by authority of the government of the State of New York. The city also owns the ground. In the year 1900, \$150,000 was available for continuing the construction of the building. When the future completion of this enormous building is considered it may well be asked whether so great a show museum for natural history can still attain its objects.

The value of the existing collections is estimated at \$2,800,000, and the library contains about 44,000 volumes.^d The annual expenses of \$136,000 are borne by the city, under authority of the government of the State of New York; \$93,000 of these expenses are made up of salaries and wages. In the year 1899, \$48,000 additional was raised by private contribution. Of the 71 employees 14 are scientists. A president who serves without salary is at the head of the institution, under a board of trustees of 24 members, mostly patrons of the establishment. Together with the president, who is a layman, a zoologist or paleontologist looks after the general scientific interests of the museum,^e which are discussed with the higher officials as in a university faculty. The institution is divided into six departments:^f (1) Public instruction; (2) geology, mineralogy, conchology, and marine invertebrates; (3) vertebrates; (4) vertebrate paleontology; (5) anthropology (physical anthropology, archeology, and ethnography); (6) entomology.

Each department is under the direction of a curator. Three of these curators have only two assistants each; one department has one

^a The area is 750 feet square, equal to about 13 acres, or as large as the ground area of the British Museum, which, however, now occupies only 8 acres with its buildings, and as great as the ground area of the Natural History Museum in London, of which only 4 acres are now occupied by the building itself, 675 feet long, or four times as large as the old market in Dresden.

^b It is still a question whether this will be erected. The towers of the Natural History Museum in London are 192 feet high.

^c The building of the Natural History Museum in London cost \$2,000,000.

^d In 1901, 55,308 volumes.

^e Recently (1902) the post of a director was created.

^f Now (1903) there are twelve departments, as follows: (1) Public instruction; (2) geology and invertebrate paleontology; (3) mammalogy and ornithology; (4) vertebrate paleontology; (5) archeology; (6) ethnology; (7) mineralogy and conchology; (8) invertebrate zoology; (9) entomology; (10) physiology; (11) books and publications; (12) maps and charts.

assistant—in fact, there is too little scientific help for so great a museum. It is under the

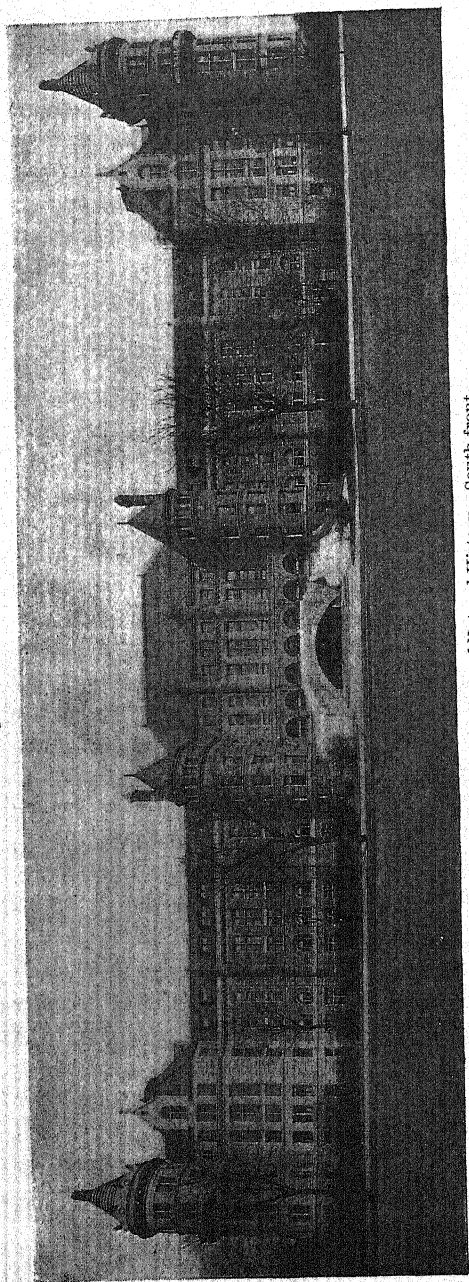


FIG. 1.—American Museum of Natural History. South front.

formal control of the regents of the university of the State of New York in Albany (see under Albany). The working hours of the scientists are from 9 or 10 a. m. to 5 p. m.; those of the other employees, from 7 or 8 to 5. For the increase of the collections \$95,000 is appropriated annually, including the cost of expeditions. This sum is derived from private contributions, \$18,500 of which is interest on a fund thus established.

Besides this, about \$10,000 are received from membership fees, and \$1,400 from admission fees. In 1899 the trustees expended \$75,000 to make good a deficit caused by purchases. The museum is open daily from 9 to 5^a (Monday and Tuesday on payment of 25 cents entrance fee), Sunday from 1 to 5, and Tuesday and Saturday evenings from 8 to 10. Children under 8 or 9 years are admitted only when accompanied by grown persons. In 1899 the visitors numbered over 458,000 persons.^b Umbrellas and canes are checked free—voluntary fees for this service are not customary. In 1898, 71 public evening lectures were given in a room on the ground floor, which is

^a From such constant exposure to light, which, nevertheless, is usual in American museums, many portions of the collections rapidly go to ruin.

^b This number has probably not increased after three years, for in 1902, 460,000 visitors were recorded; in 1900, 523,522; and in 1901, 461,026.

105 feet square, and accommodates 1,000 persons. A new lecture room, 130 by 130 feet, designed to accommodate 1,500 persons, has been completed. It is situated under the projected central tower. These lectures were given by assistants in the museum, professors of Columbia University in New York, and other scholars. There is a more extensive series, intended especially for teachers, for which the State of New York appropriates \$12,000. The entire series of lectures in 1899 was attended by more than 66,000 persons, of whom 13,500 were teachers. There are also evening receptions and exhibitions of scientific societies.

The museum publishes annual reports (the thirty-first, for 1899, has 11 plates and 96 pages); octavo bulletins, with scientific papers and plates, of which 12 volumes have appeared; and quarto memoirs, of which 3 volumes are in print. There have also been published several illustrated guides for certain departments; and an illustrated monthly, *The American Museum Journal*, has been started. The museum sends out series of scientific expeditions, which are constantly bringing in a mass of fresh material, including valuable purchases. In the year 1899, 2 zoological, 3 paleontological, and 8 anthropological expeditions were in progress. These 8 expeditions, devoted to the anthropological, archeological, and ethnographical researches in the country, added to the museum 50,000 specimens.

The building is fireproof, of brick and iron, the floors being covered with tile and marble mosaic. The furniture is of wood. There are almost 20,000 lineal feet of cases and desks, for the increase of which an additional \$75,000 was available in 1900. The plant for heating, ventilating, and lighting is now in the cellar, but is, however, to be removed to one of the courts on account of the marked shaking of the building. This will require an expenditure of \$40,000. The heating is by steam. Ventilators, driven by steam power, force fresh air through the shafts into the building. Electricity and gas afford illumination. The rooms in the cellar and garret are spacious and light. Broad, slate-covered iron steps, in well-lighted staircases, lead from the bottom to the top of the building, but are little used, since large electric elevators, with a capacity of fifteen persons each, are constantly going up and down. The architectural and color ornamentation of the interior is simple throughout, often, one might say, scarcely present—a feature which distinguishes this from many European museums in a most advantageous manner. The painting of the interior is white or of a uniform light color.

Since the buildings as they now stand were erected separately during a period of over twenty-five years, something was necessarily gained by experience. The newer parts are more perfect than the older, and there can be no doubt that the remaining five-sixths of the museum to be constructed will be still better; since in such a complex mass of structures it is not necessary to maintain perfect uniformity in

the architectural details, slight departures are allowable from the general style to avoid defects brought to light by experience. Some of the newest rooms leave little to be desired with regard to dimensions, light, and fittings, as also with regard to the electric illumination directly from the ceiling. It may be strongly recommended that in other similar buildings attention be paid to what has here been accomplished.

Each floor is provided with very long lines of fire hose, which are connected with steam engines; moreover, portable fire extinguishers are to be found everywhere.

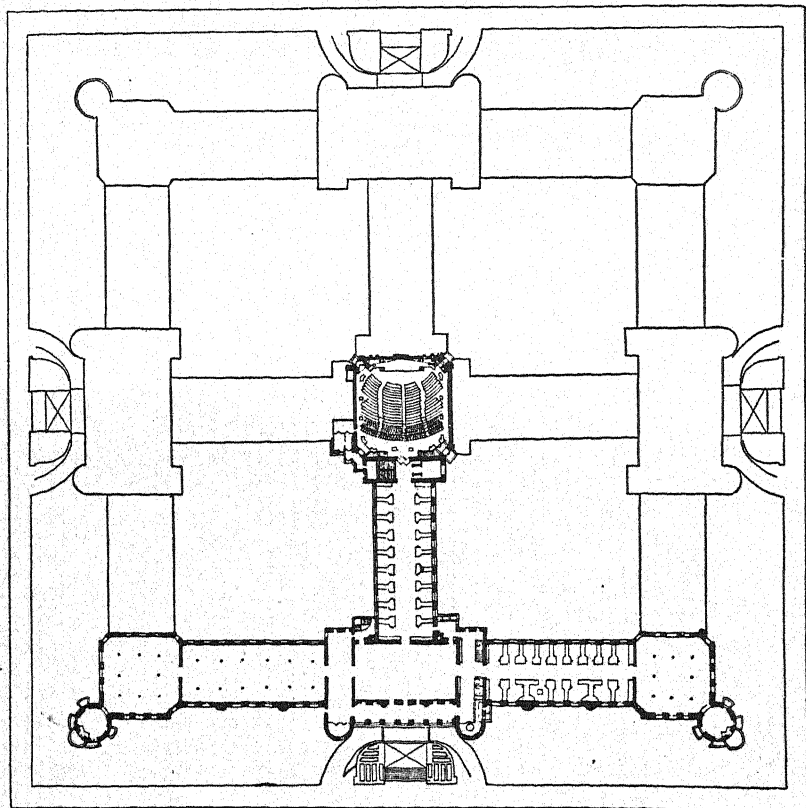


FIG. 2.—American Museum of Natural History. Ground plan. The heavier lines indicate the finished part of the building.

The collections are still unequally developed, a fact which may be explained by their recent acquisition. America, however, stands in the foreground in regard to collections. Paleontology shows a certain preponderance. North American mammals and reptiles are especially well represented. The series showing the development of the horse and the rhinoceros deserve especial attention, as also the giant reptiles—for example, a gigantic plant-eating dinosaurian 62 feet long.^a Special

^a*Camarasaurus supremus* Cope, see Memoirs, I, p. 5, 1899, and Bulletin No. 10, pp. 219-233, with 13 figures.

attention is paid to the art of stuffing and mounting animals.^a Examples of this may be found in the great groups of the American elk and bison, surrounded by artificial foliage and the like, in cases 32 feet long, 18 feet wide, and 14 feet high; and also in different groups of birds, as for example, the pelicans. There are 55 such groups of birds and 20 of mammals displayed in as many separate cases, independent of the systematic collection.

In a section of the local bird collection the residents are separated from the migrants, and the latter are arranged in such a manner as to show those occurring in the neighborhood in different months, an arrangement that stimulates observation of nature. There are altogether about 12,000 stuffed birds in the collection. Particular attention should be called also to the room devoted to North American woods, especially to sections of the trunks, with the foliage, blossoms, and fruits in water color. Almost every forest tree north of Mexico is represented. The comprehensive collections of skeletons, displayed on the fifth story in a long corridor lighted from above, are practical and readily accessible. They lie in open, interchangeable, sliding drawers in cases with glass doors, so that the contents are readily accessible. The collections of 15,000 mammal skins and 70,000 bird skins are kept in separate and well-closed tin cases of three different sizes, standing one above another, with light, interchangeable sliding trays—an arrangement to be recommended in case of lack of space. Disinfection is accomplished by means of hot air (127° C.), and also by bisulphide of carbon and by formalin.^b

Of the ethnographic and prehistoric collections, the American series

^aThe first preparator, J. Rowley, has published a book on the subject, *The Art of Taxidermy* (New York, D. Appleton & Co., 1898), in which may be found further information regarding some special methods.

^bSome additional details regarding the collections may be given here. In the paleontological section are to be found the North American invertebrates of James Hall (see also under Albany), with their many types, which were purchased in 1875 for \$70,000; the North American mammals, reptiles, amphibia, and fishes of E. D. Cope, as well as his pampas mammals; the Terrell collection of fossil fishes from Ohio; a fine series of moa skeletons, and the rich returns of the expeditions which the museum sends out every year. Besides what has been mentioned, we may also refer to the series of *Titanothereum* species and the *Tylosaurus dyspelor* (Cope), over 30 feet long. The entomological section contains one of the foremost general collections of insects in America, with about 400,000 specimens (Dresden has 280,000) and especially rich in types. The conchological section is conspicuous. The collection of mammal and bird skins is limited almost entirely to America. It contains the ornithological collections of Prince Max von Wied from Brazil, with many types; that of G. N. Lawrence from North America, and D. G. Elliot's collection of humming birds. The mineralogical section is very large and especially rich in jewels, which were collected by G. F. Kunz, the mineralogist of the well-known New York firm of Tiffany & Co., for the Paris Exposition of 1889. Another collection by the same mineralogist has just been purchased from the recent Paris Exposition for \$50,000 and presented to the museum. [Mr. J. P. Morgan presented in 1901 the celebrated Bement collection of minerals, worth \$200,000.] Finally, special mention may be made of a great collection of American building stones.

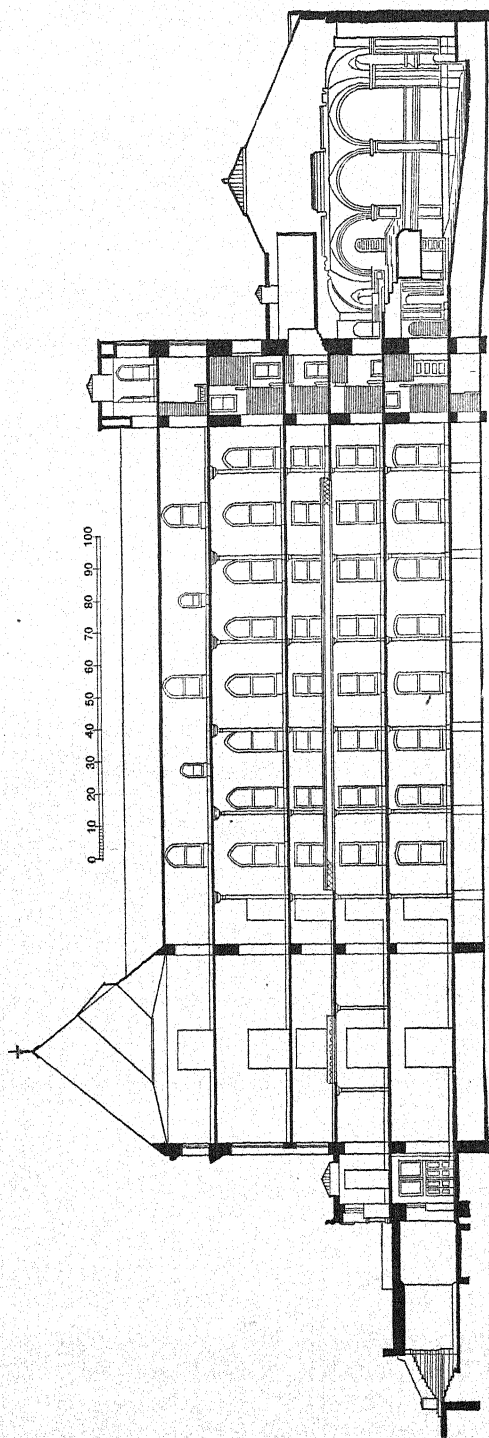


FIG. 3.—American Museum of Natural History. Section through the middle axis.

are noteworthy. The other regions of the earth, with the exception of the South Sea, are, on the other hand, as yet scarcely represented. The former already occupy five halls, each 85 by 183 feet long and 65

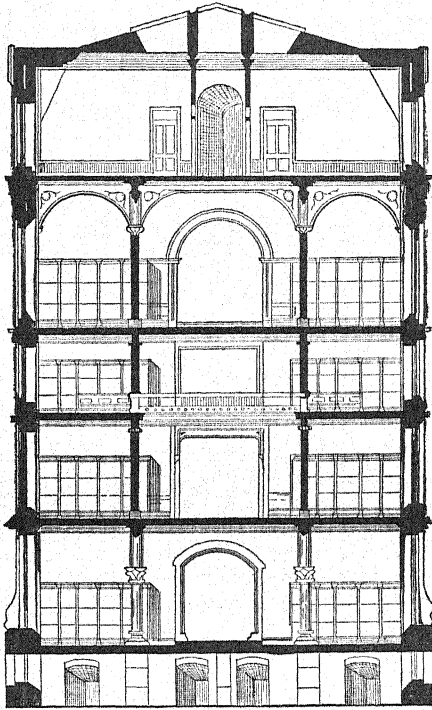


FIG. 4.—American Museum of Natural History. Cross section through the oldest wing.

by 85 feet wide, and four other similar halls will soon be ready. The nine halls have more than 118,000 square feet of floor surface (the ethnographic collection in Dresden, 2,600). The room devoted to North-

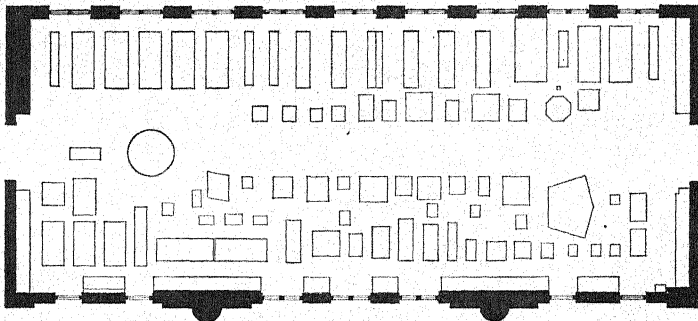


FIG. 5.—American Museum of Natural History. Floor plan of the Mexican hall.

western American culture (Pacific coast), in its comprehensiveness and its richness, makes a notable impression. The exhibition is instructive because it is arranged not only in geographical, but also in systematic

series, the latter particularly with regard to ornament and development of style in the artistic manifestations of the Indian tribes. The Mexican sculpture hall is equally rich and still more imposing. Here are casts, some of them colored, of monoliths, stelæ, idols, altars, pillars, walls, etc., of the ruins of Mexico and Central America, the originals of which still lie, with few exceptions, in the tropical thickets among the remains of ancient temples. There are also original stone sculptures from Copan and Yucatan, as well as ceramic and kindred collections relating to ancient Central American civilizations. Among these I may mention particularly the great series of nephrite, jadeite, and chloromelanite specimens.^a

^aThe finest and most comprehensive collection of such nephrite and jadeite from all parts of the earth is in possession of H. R. Bishop, 881 Fifth avenue, New York, who has prepared a great work concerning them; it cost \$40,000 to prepare the illustrations alone. In 1903, after the death of Mr. Bishop, this collection was incorporated in the Metropolitan Museum of Art in New York, which has thus acquired an inestimable treasure.

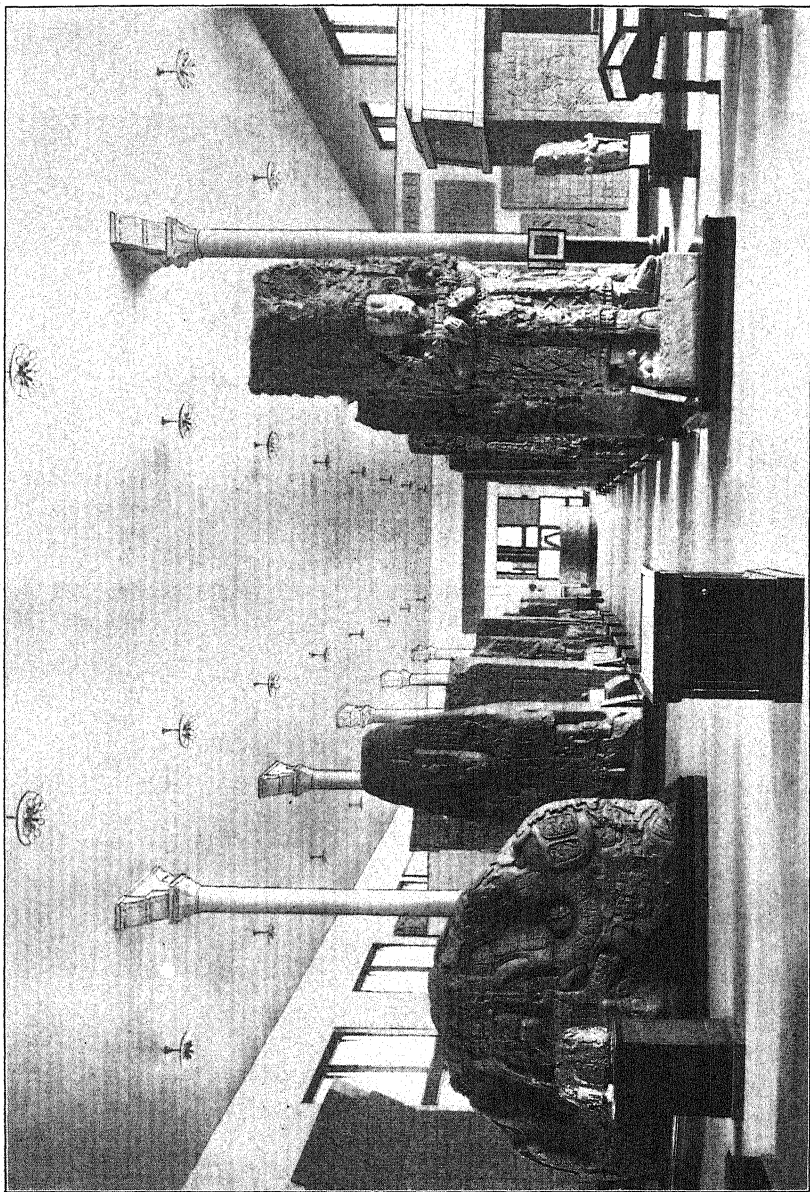
I add here a more detailed description of the ethnographic-archeological collection.

Two rooms on the first floor are devoted to ethnology, one on the second floor to North American archeology, particularly collections from the Pueblo region; the third floor (gallery) contains South American collections; the fourth, collections from Mexico and Central America. Four additional rooms in the southwest corner of the museum, which has just been completed, are to be devoted likewise to anthropology; on the first floor a continuation of the ethnological collections; on the second, of the collections of North American archeology; on the third, of the collections of South American archeology; on the fourth, continuation of the Mexican collections. The ethnographic halls contain especially quite complete collections from the North Pacific coast of America, from the Eskimos from northeast America, from the islands of the Pacific Ocean, among them a series of old specimens in particularly good condition from New Zealand, Hervey, Fiji, Samoa, etc. (such as may also be found in Cambridge, Boston, and Salem), and excellent collections from Mexico. Africa and Asia (excepting the Ainos) are as yet scarcely represented. [There have since been received large collections from China.] The annual report for 1899 says, on page 18, "Our collections from Europe, Asia, Africa, Australia, and many of the South Sea Islands are very poor."

The collections from the North Pacific coast depict the life in its different aspects. A group of four figures of natural size shows the domestic life of the Indians of this region, and at the same time the important part which the cedar plays in their economy. Alongside of it the employment of natural products is represented. Then comes a row of cases to represent the following categories: Art and industry products, household utensils, travel and transportation, hunting and fishing, war, clothing and ornaments, trade and exchange, music, decorative art, totemism, and religious ideas. In this row of cases are brought together the general characteristics of the North Pacific culture. Then follow cases showing the particular characteristics of the Tlingit, Haida, Tsimshian, Kwakiutl, Nutka, and the Salish tribes of British Columbia and the State of Washington.

The collection is important for an understanding of the artistic style of the Indians, particularly on account of the already well-explained objects from the North Pacific coast, for an understanding of the basket making of the States of Washington and California and of the style of ornaments of the Indians of the plains and western Mexico, etc.

Toward the close of 1899 the Mexican sculpture room was opened, of which I have



AMERICAN MUSEUM OF NATURAL HISTORY.
Hall of Mexican antiquities.

It may be assumed with certainty that this museum will develop during the twentieth century into one of the foremost natural history institutions of the world; and its president, Morris K. Jesup, under whose personal, self-sacrificing,^a widely influential direction it has been since 1881, is thereby setting up for himself a lasting monument.^b

given an illustration in Plate II and plan on p. 335. It was described in *Science*, XI, 1900, p. 20, by F. W. Putnam, the head of the department (and also director of the Peabody Museum of Archeology in Cambridge, Massachusetts). He considers this the most important collection in existence for the study of ancient Mexican and Central American civilization. I present herewith an abstract of his description.

Near the entrance the so-called "Great Turtle of Quiriqua" attracts attention. Beside it stands the "Dwarf," the smallest of the stele from the ruins of Quiriqua. A cast of the largest of these monoliths, 25 feet high, is in the hall below. On the right of the hall is a restoration of the sanctuary of the "Temple of the Cross," in Palenque, showing the position of the bas-relief known as the "Tablet of the Cross," with the officiating priests and an hieroglyphic inscription. Attached is an illustrated label explanatory of this temple. In the adjoining table case are several pieces showing hieroglyphics and figures made in stucco, which was widely used. The great "Calendar Stone," the most remarkable of Mexican sculptures, is on the south wall. On the opposite side of the hall are many fine bas-reliefs from ruins in Guatemala, Honduras, Palenque, and Yucatan. Over a case at the east end of the hall is a group of slabs from Palenque upon which are many columns of hieroglyphs. Near by are casts of slabs from the ruins of Chichen Itza in Yucatan, also sculptured stone posts of a doorway, upon which rests a carved wooden lintel. To the right of this is shown the sculptured wall of a portion of a room in a temple at Chichen Itza, on which are many human figures and a feathered serpent. There is evidence that this and many of the other sculptures were formerly painted in several colors, of which red, yellow, and blue predominated, as, for instance, the statue of Chac-Mools from Chichen Itza.

There are also on exhibition Tarascan terra cotta figures and stone sculptures, original sculptures in stone from Copan and Yucatan, pottery from the ruins of Casas Grandes, illustrating a culture approaching that of the ancient Pueblo people of Arizona and New Mexico; and also jadeite ornaments, copper implements and ornaments, carved stone yokes, a large terra cotta human figure, and pottery vessels of many forms, all illustrative of the culture of several of the ancient Mexican peoples. There are collections made by Doctor Seler in Mexico and Guatemala, and valuable terra cotta figures found in a mound at Xoxo, a cast of the inscribed stone lintel of the door of this tomb, and many vessels and skeletons. Finally, in a center case are various facsimiles of Mexican and Maya manuscripts in European collections. Compare also Ehrenreich's statements of the year 1898, regarding this department of the New York Museum in *Zeitschrift für Ethnologie*, 1900, pages 4-8, with three figures. (See also, opening of the anthropological collection in the American Museum of Natural History, *Science*, 1900, pp. 720-722.—1903.)

^a In the year 1899 alone, Mr. Jesup gave \$30,000 to the museum. In the course of almost twenty years, during which he has officiated as president, he has expended enormous sums on it. The Berlin Geographical Society recently made him an honorary member in recognition of his services for the advancement of the sciences. He is at the same time still actively engaged in the banking business.

^b In conclusion, let me add a few more detailed remarks:

The orientation of the entire building would have been more favorable if its diagonal had been turned on its central point about 11 degrees, so that the façade, now completed, would face toward the southwest instead of toward the south-southwest.

2. MUSEUM OF THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES.

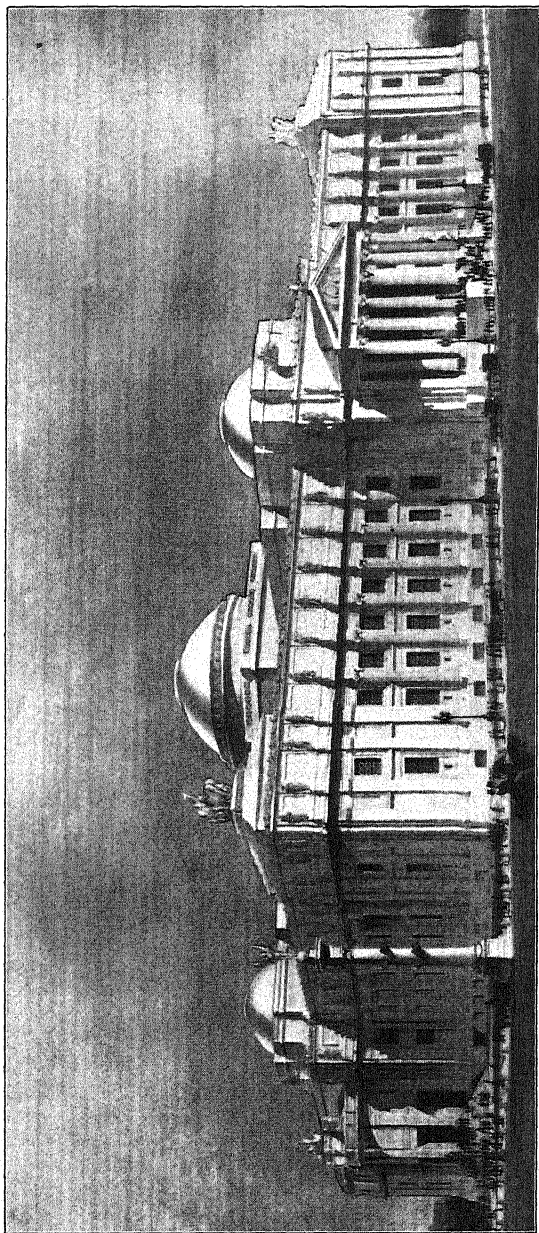
Brooklyn, with more than 1,250,000 inhabitants, has formed part of Greater New York since 1897. The Brooklyn Institute of Arts and Sciences dates from 1824, and received its present name in 1887. Its principal aim is the diffusion of knowledge by means of lectures, instruction, and museum collections. Its motto is from Washington's celebrated farewell address: "Promote as an object of primary

In that case the long side would be less exposed to the direct rays of the sun. It would then have been unnecessary constantly to protect the collections on exhibition by window curtains, which, under the direct rays of the sun, change the proper color of the objects and make conditions for exhibition unsuitable. This fact is usually lost sight of in connection with museum buildings, to the disadvantage of the collections installed in them. In the case under consideration the lines of the existing streets were followed. The unconformity which would have occurred by a slight turning of the building could, however, have been masked by planting groups of trees and the like. The building is massive and imposing, with a rich moulding, added solely with a view to architectural effect. The arrangement of individual rooms resulting from it is in many cases unsuited. As is very often the case with museums, this one was not built solely with reference to its needs; that is, constructed from within outward and the outer form of the building made to conform to the interior design. Thus, for example, the great projecting central part of the building darkens the halls lying behind it; the projecting towers produce inconsistency and irregularity in a number of the inner rooms; the crossbars of the windows and the window posts are too wide, and thereby unnecessarily reduce the light in the interior; in certain stories the windows themselves ought to have been higher and not extended down as far as the floor, for, had this been the case, the only advantageous method of lighting, by upper side light, etc., would have been secured.

The proportions of length, breadth, and height of some halls, and the width of the spaces between windows in relation to the width of the windows, are often extremely well worked out, so that individual portions of the museum, rather than the whole building, make the best impression.

The furniture, cases, and desks are of wood, with heavy framework, generally with many crossbars and relatively small panes, and they are not dust proof, except in the large show cases without doors. It is the more astonishing that they have not introduced iron cases, such as are to be found in many European museums, since America is far in advance of Europe in fitting out libraries and archives with iron furniture, and understands how to install it in a more perfect manner than we have yet attained. Objection may also be made to the dimensions and to the peculiar shape and the position of many of the cases with regard to the source of light. Too little regard has been paid to the architecture in its bearings upon the lighting arrangements; thus several of the fine large groups of animals (the bison, among others) are considerably injured by reflections from the glass panes, which are distributed carelessly without consideration of the source of light. This, however, could easily be remedied. For the sizes of the cases and their distribution, it would have been more advantageous if the iron-supporting columns had stood farther toward the middle of the halls. These columns also run directly into the ceiling. The richly ornamented capitals in some halls do not harmonize with the prevailing simplicity of the interior decorations which in a great degree are worthy of imitation, except that in some of the older parts of the building they are too rough.

I have already mentioned that the number of scientific workers employed in this museum, which is advancing with giant strides, is entirely inadequate. The mass



BROOKLYN INSTITUTE OF ARTS AND SCIENCES.
General view of the projected Museum Building.

importance institutions for the increase and diffusion of knowledge." The society which composes the institute has about 6,000 members, "who pay \$5 entrance fee and annual dues, and is divided into 27 scientific and artistic sections, which meet in different buildings. At the head is a president with a board of 52 trustees and 11 different committees. The members also are organized into a council and 8 committees. The whole establishment is under the nominal control of the University of the State of New York (see under Albany). It

of material which is continually flowing in from the many expeditions, donations, and purchases, can not be properly attended to nor scientifically treated. The employees are therefore overburdened, an evil which I encountered in many of the American museums. Their outward splendors are out of proportion to the number and position of the scientists employed in them. The relatively small salaries usual in the United States, the instability of the positions (even under political influence), and the absence of the pension system contrast unfavorably with the conditions prevailing in Europe, where museums are better regulated and the positions more secure, and are more in consonance with the principles of fairness. Certainly museum employees do not command the same respect and enjoy the same rights in the Union as in the Old World. The employee is at a disadvantage against the influential powers who furnish to the museums the means of existence, is too much dependent upon them, and too much restrained in his rights. So much the more worthy of unstinted admiration are the idealism and the splendid achievements of many scientific men working under unfavorable conditions.

The lack of a central expert administration in the New York Museum [a director has since been nominated.—1903] is evident from the fact that all possible colors of backgrounds and labels are met with, as well as greatly varied methods of mounting, which are by no means all worthy of imitation.

The animal groups are excellently mounted. The accessories of leaves and flowers are carefully cast in wax and consequently transparent and very true to nature, but somewhat obtrusive. There is too much of this good work, for the attention is diverted from the object of the exhibition.

The manner of preserving the great skin collection in single tin boxes, with light trays of wood and pasteboard piled high one upon another, is inconvenient in the narrow rooms in which they are kept, although these boxes, whose lids can be taken off or tightly fastened with bolts, may in themselves be very practical. These trays are disinfected with bisulphide of carbon, which must often be renewed, and can be neither agreeable nor wholesome for the employees.

The butterflies of the exhibition collection are displayed in desks in a peculiar way, each specimen in a little pasteboard box by itself, covered with glass, on a thin gypsum plate adapted to its form—an arrangement which requires much space and produces, on the whole, a monotonous effect, however pretty each specimen may look. On page 32 of the Annual Report for 1899 there is an illustration of such a clumsy butterfly case. The makers of this method of preparation, Denton Brothers, of Wellesley, Mass., received at the Paris Exposition of 1900, a gold medal for their "collection and preservation of butterflies."

I do not, however, wish to be misunderstood. The American Museum of Natural History offers something quite extraordinary and stands relatively upon a very high plane, so that one not only may, but willingly does, overlook minor defects. Besides, what museum can be called faultless. I am convinced that this magnificently founded institution, in its further development, will in every respect be worth imitating.

^a In 1902, 7,215 members.

maintains also a biological laboratory on the seashore, with 12 employees, as well as a larger museum for children in Bedford Park, the latter with 3 employees, one of whom is a naturalist.^a The art building on Montague street, worth about \$125,000, stands financially and otherwise in close relation to the institute. The library includes 27,000 volumes. From June 1, 1898, to May 31, 1899, 3,806 meetings were held, including lectures, demonstrations, and class reunions, which were attended by over 360,000 persons. The Institute has an invested fund of over \$250,000, and an annual income of \$175,000. The city gives \$50,000, by authority of the government, of the State

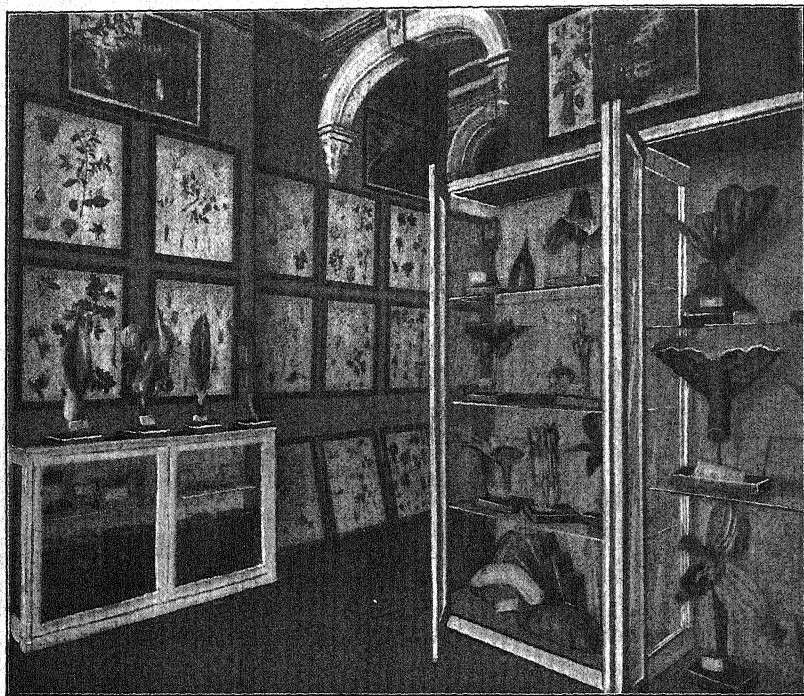


FIG. 6.—Brooklyn Institute of Arts and Sciences. A corner in the room devoted to Botany.

of New York, primarily for the running of the museum, and \$75,000 are received from private donations.

^aThe museum for children is designed for young people from 6 to 20 years of age, and includes all human endeavors and interests, so far as they are comprehensive for youth or can serve for their education. The objects chosen all bear a definite relation to home life and school life. In 6 rooms on the basement floor are collections of models, animals, plants, anatomical preparations and meteorological instruments, as well as a lecture room which will accommodate 40. On the first floor are the library and administration rooms. The rooms are prettily decorated, and the cases are low enough to enable children to see everything well. Many things are here brought together which are of interest also to grown persons. I may mention a so-called type collection, such as is used in elementary schools in France. It con-

Not until 1890 did the Institute begin the founding of a museum. The cost of building and furnishing is borne by the city. Though not quite as large as the Natural History Museum in New York, it is planned on a great scale. The building ground is at the southwestern end of Brooklyn, on Prospect Hill, 175 feet in height, in an extensive partly-wild park of the same name, where 12 acres of land (750 by 725 feet) are reserved by the city for the museum. The collections comprise the arts and sciences. It is proposed to construct a square building in the renaissance style, with cupolas, facing almost exactly

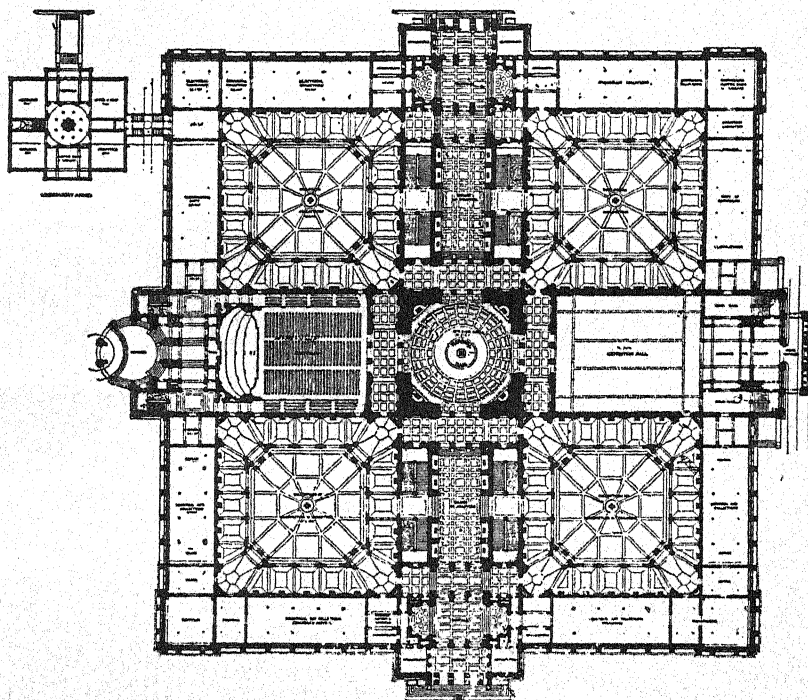


FIG. 7.—Brooklyn Institute of Arts and Sciences. Plan of first floor of the projected building.

north and south. Each side will be 560 feet long, thus occupying an area of 7 acres, or more than twice the size of the old market in Dres-

tain. It contains 35 minerals, 20 plants, 13 fossils, 3 worms, 3 echinoderms, 2 crabs, 90 insects, 10 mollusks, 2 fishes, 3 reptiles, 3 birds, and 2 mammals—altogether 186 specimens, and costs \$20 in France. Further, as an example of how things are demonstrated to the children, to represent the leather industry there is shown a piece of animal hide, the different substances for tanning and dyeing, and also the bristles used in the manufacture of brushes. Or else, on a map of France, the wine districts are designated by small wine bottles, the coal districts by fragments of coal, the distribution of navigation by miniature metal ships, that of glass manufactures by little pieces of glass, etc. Nine hundred pictures and tableaux are hung up in succession. School teachers can also use the material of the collection in lectures to their pupils.

den. It will have four covered courts and three stories, exclusive of the basement, and in the central axis a fourth floor, the upper stories with skylights. Surrounding it is an open space 125 feet wide, reserved for greens and shrubs. (An exact plan of the whole building may be found in the eleventh Yearbook of the Institute, 1899, page 389.) The architects are McKim, Mead & White.

The foundation was laid in 1895, and in 1897 the first portion, the right wing of the north section, was completed (with exception of the statues of the chief frieze). This wing is 193 feet long, 43 by 64 feet wide, and 95 feet high (above ground). It is fireproof throughout, excepting a few wooden window frames on the ground floor (all others of iron), and a few oaken doors. The floors are supported by iron

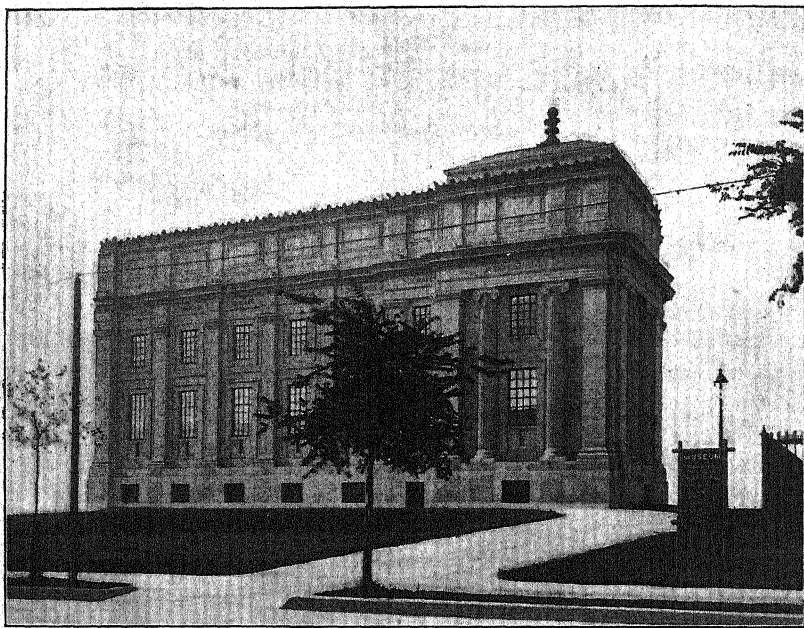


FIG. 8.—Brooklyn Institute of Arts and Sciences. Finished portion of the Museum (1897).

beams and brick arches and are covered with terrazzo on a cement foundation. The façade is of white sandstone, harmoniously wrought. This portion cost, with furnishings, about \$375,000, and represents about one-thirtieth of the entire building. The erection of the central building of the north side of the main portal has been begun,^a for which \$300,000 have been appropriated by the city. The collections are enlarged exclusively by donations. A learned director (at present a paleontologist) is at the head of the museum, which has 17 employees, 7 of whom are scientists,^b and several honorary administrators of indi-

^a Finished in 1903.

^b A curator in natural history and anthropology and a curator in archaeology and ethnology have since been appointed.

vidual sections with their subordinates. The working hours are from 9 to 6 on week days and the afternoon of Sunday; there is a weekly half holiday. The number of visitors in 1898-99 was about 93,000. Admission is free on Wednesday, Thursday, Friday, Saturday, and Sunday, even when these are holidays; on Wednesday and Saturday from 9 to 6; Thursday and Friday from 7.30 a. m. to 7.45 p. m., and Sunday from 2 to 6 p. m. On Monday and Tuesday from 9 to 6 there is an admission fee of 25 cents; children under 16 years, 10 cents, and children under 14 years are only admitted when accompanied by a grown person. Umbrellas and canes are checked free, voluntary gifts for this service not being customary. The Institute publishes an illustrated Yearbook (the eleventh for 1898-99 has 422 pages), as well as an annual prospectus, which contains reliable information regarding the lectures, demonstrations, and instruction. The prospectus for 1899-1900 contained 181 pages. The museum has as yet published only one catalogue of paintings (in two editions, 1898 and 1900), and an illustrated catalogue of the Goodyear collection of photographs of Italian architecture and sculpture (1896), which were taken on one of the museum expeditions (1895).^a Other scientific expeditions are projected.

The distribution of space and the lighting of the portion of the building now standing are excellent.^b As in the Natural History Museum in New York, the halls are almost without ornament. The walls and ceilings are white or of a uniform color, the lobbies and staircase light gray. This deserves special mention because the collections of so many museums, at least in Europe, are rather injured than benefited by too much decoration, or by the style of the decoration of the galleries. The engines for heating, ventilating, lighting, and electric power are located in the basement, and cause a shaking in certain portions of the building. The steam radiators are placed mostly under the windows or near them. A hot-air plant, besides, run by the steam engine, heats all the halls through openings about two-thirds above the floors. Ventilation is accomplished by means of an electric ventilator in the roof, but this does not seem free from objections. The problem is seldom well solved in large buildings. In the axis of a well-lighted, spacious, spiral staircase (iron steps overlaid with slate) an electric elevator runs to the roof, from which, on account of the high situation of the building, may be enjoyed a fine, extensive view, with the Botanical Gardens and Prospect Park in the foreground. The basement is 25 feet high and con-

^a The publication of a *Science Bulletin* and of *Memoirs of Art and Archeology* have since begun.—1903.

^b In this north tract the unfavorable position of the entire building with regard to the points of the compass is less apparent because the south side, which will adjoin a covered court, is in part protected from the rays of the sun.

tains exhibition rooms, administrative rooms, and machinery rooms. Each of the three floors contains four halls for collections—one 110 by 38 feet, one 42 by 42 feet, and two 16 by 40 feet. The first story is 29 feet high, the second, 22 feet; the third, with skylight, 24 feet.^a All may be brightly lighted by electricity. Hand fire extinguishers are found on each floor, and on the ground floor a line of hose 150 feet long.

The basement contains a geographical collection, with many maps. The hall in which this is kept is plainly furnished and well lighted from both sides. The walls are light green, the ceiling white, and the floor of dark cement.

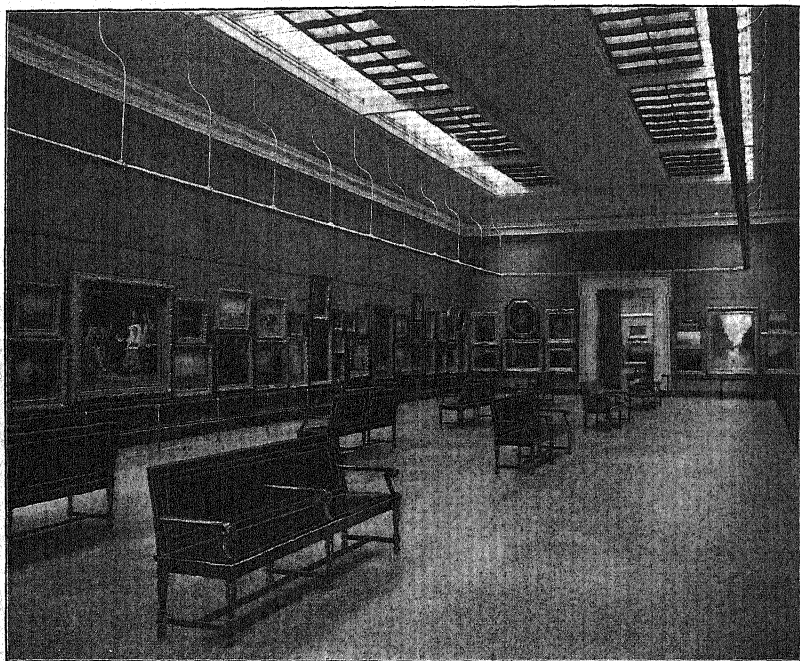


FIG. 9.—Brooklyn Institute of Arts and Sciences. Picture gallery.

The first story is devoted to sculpture. The great hall, where are found Greek and Roman statuary, is excellently lighted from the north side by means of upper side windows. The white casts are tastefully mounted on dark green pedestals against a light olive-green background. The ceiling is white, the window frames are a very light ocher, and the floor is gray mosaic, as are the other floors. The south side consists of a solid wall without windows, on the upper part of which the Parthenon frieze is displayed. Comfortable benches

^a This is the picture gallery. The halls of the Dresden picture gallery, erected by G. Semper, are nearly 50 feet high; they are, in fact, much too high, and the skylights are too small, so that the halls are insufficiently lighted.—1903.

invite the visitor to prolong his stay. In this section is the magnificent collection of Italian photographs of Professor Goodyear.

The second floor is devoted to natural history and prehistoric objects with special reference to America. The large hall is lighted excellently from both sides except when the sun shines in from the south. The cases stand at right angles to the wall spaces between the windows, by which the best possible effect of lighting is attained. The walls are cream colored, the ceiling white, and the window frames ocher.^a

The paintings are on the third floor (lighted from above), most of them provisionally loaned. The great gallery is not yet overfilled, and is furnished with comfortable benches. The walls are light Pompeian red, the ceiling white. Picture galleries are seldom seen in which the examination of the works of art are so little disturbed by the surroundings. The collection is, for an American collection, rich in landscapes of the seventeenth century and other works of the old masters, as also in pictures of the French school of 1830. I give in alphabetical order the names of the artists who are represented by more noteworthy paintings: Corot (4), Cortese (2), Courbet (3), Cuyp, Daubigny (3), Decamps (3), Diaz (5), Dupré (3), Etty (2), Fyt, Gainsborough (2), Géricault (2), V. Goyen (2), Hals, Hobbema, Lorrain, Marilhat, J. Maris (3), W. Maris (2), Mauve (7), Metsu, Michel (3), V. Mieris, Millet, Morland (3), Pannini (3), Rembrandt, De Reyn, Rosa (3), Rousseau (3), Ryckaert, Stork, J. Vernet (3), Vollon (2), Wilkie, Wilson (3).

The collections, noteworthy as they already are, may still be regarded merely as a beginning of much greater achievements. One might well wish to live to see the completion of the entire building, since it promises to be a highly creditable accomplishment, and the devotion of the citizens of this rich city guarantees that the museum will not lack good collections.

3. METROPOLITAN MUSEUM OF ART.

"For the purpose of establishing and maintaining a museum and library of art, of encouraging and developing the study of the fine arts, and the application of arts to manufactures and practical life, of advancing the general knowledge of kindred subjects, and, to that

^a The cases are of wood, with clumsy framework, not meeting the present requirements (see remarks on the American Museum of Natural History, p. 338, footnote.) In a building where everything is fireproof—which even has iron window frames, something very hard to find anywhere else—it is strange that the kindred idea of introducing iron furniture did not occur to the builders.

The collection is still unequally developed. We may make special mention of the butterfly collection of nearly 100,000 specimens, with more than 1,200 types (the Dresden Museum has about 40,000 specimens, including about 8,000 species). No special care has as yet been bestowed upon the methods of exhibition.

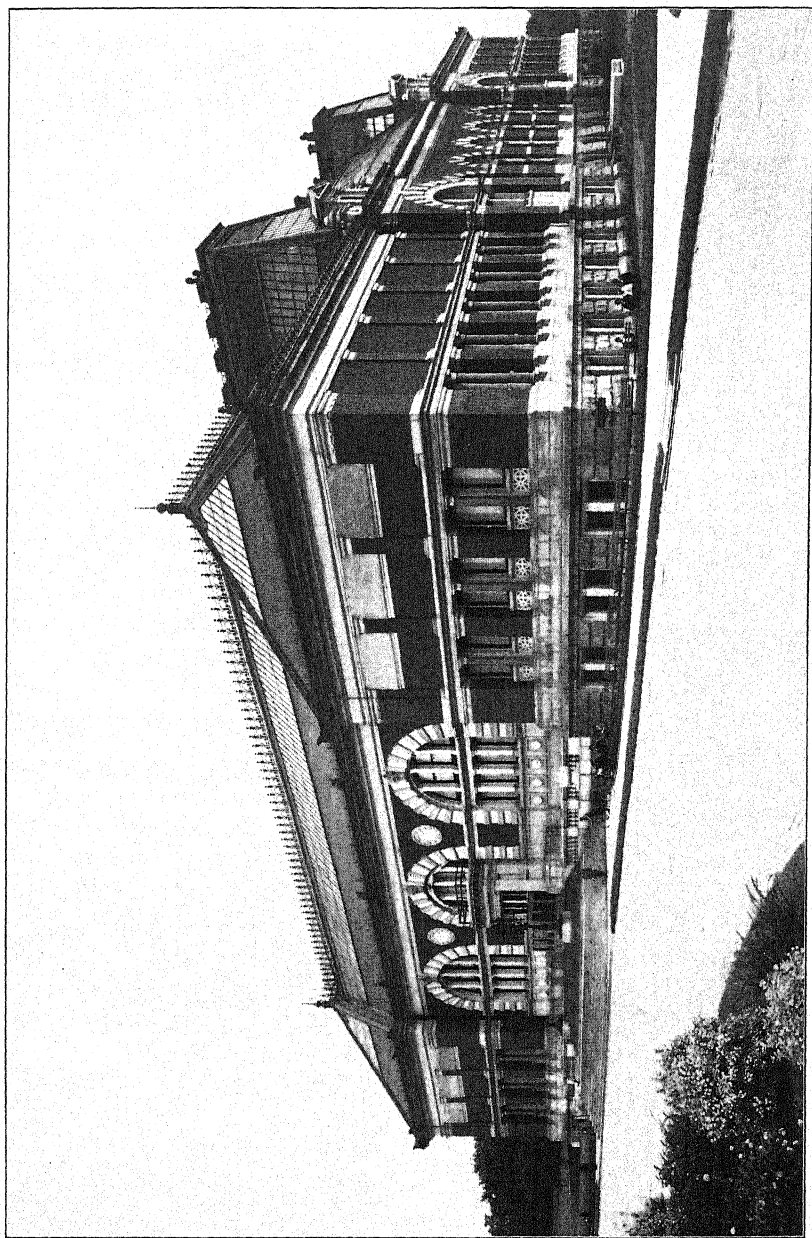
end, of furnishing popular instruction and recreation," the Metropolitan Museum of Art has been planned, to occupy several detached buildings covering more than 18 acres of ground in Central Park, about half a mile from the Natural History Museum. Up to the present one building has been completed.^a It is 345 feet long, 325 feet wide, and between 1876 and 1898 was erected in four sections by the elder Hunt on sloping, and, partly for that reason, deep-lying ground. It has four courts, a cellar, ground floor, and one additional story, and is constructed of red brick with gray granite trimmings, which looks very attractive, particularly in summer when the park is green. The older portion is in Italian gothic, the newer in renaissance style. The principal entrance is on one of the narrow sides. The cost amounts to \$500,000, with \$65,000 additional for interior furnishings and \$90,000 for the power house. There is, besides, an imposing fire-proof building of gray sandstone in the best renaissance style, 305 feet long, 103 feet wide, and 88 feet high, connected with the former on its rear side by a middle wing 107 feet long and 64 feet wide. This building was not finished, however, at the time of my visit.^b The architect of the new building is the younger Hunt. It cost \$1,000,000; the interior furnishings and the power house \$220,000 additional. The city donated the ground and also, by authority of the government of the State of New York at Albany, bears the cost of building and makes an annual appropriation of \$100,000 for the running expenses. These amount to about \$130,000, of which \$90,000 go for salaries and wages. The balance is paid by the corporation that founded the museum in 1870, from the interest on its funds, which amount to \$580,000,^c and from private donations and special sources of income, such as annual dues (about \$20,000 from 2,000 members at \$10), entrance fees (on two days of the week, \$5,000), sales of catalogues (\$3,000), etc.

Until 1879 the collections were stored, one after another, in two private houses. Patrons gave, and continue to give, the means for purchases, and donations and bequests were received in such profusion that the large halls of the present museum, comprising together almost $3\frac{1}{2}$ acres of space, were overcrowded after the first twenty years. They are now relieved by the removal of a portion of their contents to the new building, and the great hall of the latter is to be devoted specially to sculpture. The library has over 6,000 volumes. The value of the collections is estimated at more than \$9,000,000. The building is open on week days from 10 to 6, Monday and Friday for nonmembers at an admission fee of 25 cents; also on these two days

^a The second large building has since been completed (1903).

^b Now (1903) finished.

^c The museum in 1901 received \$8,000,000 upon the death of Mr. Rogers, one of its trustees.



METROPOLITAN MUSEUM OF ART.

from 8 to 10 in the evening, and Sunday from 1 o'clock to dark. On shorter days the building is closed before sundown. Children under 7 years are admitted only when accompanied by grown persons. Copying is allowed only on Mondays and Fridays. The number of visitors in 1899 was 540,000, of whom about 200,000 came on Sundays. Entire schools of 300 pupils often come and spend the whole day in the museum. Umbrellas and canes are checked free. Voluntary contributions are not customary, but something is paid for depositing packages and the like.

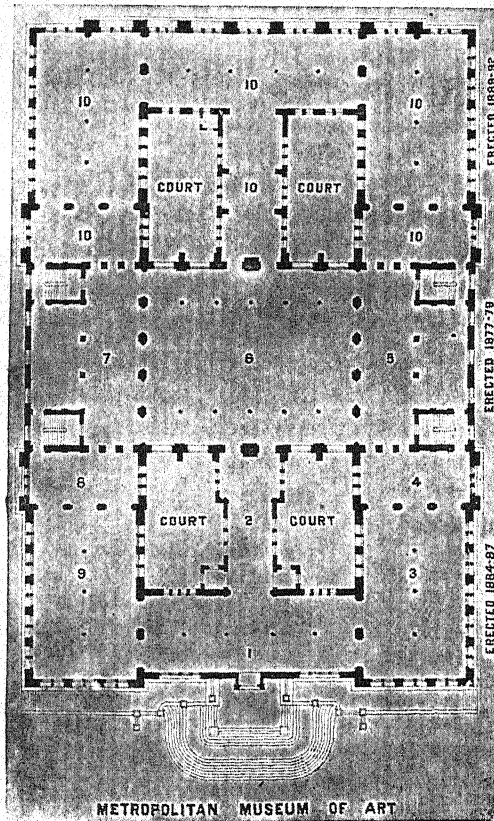


FIG. 10.—Metropolitan Museum of Art. Plan of first floor.

There has been published a series of catalogues, for the most part undated, on ancient Cyprian terra cottas and vases (3,654 numbers),^a the ancient Cyprian stone sculptures (1,814 numbers), the Egyptian antiquities (2,206 numbers), the plaster casts and bronze reproductions (1,063 numbers), the hand drawings (882 numbers), the gems (331

^aThe best and fullest publication on the Cyprian vases of the collection is to be found in W. H. Goodyear's interesting work *The Grammar of the Lotus*, 1891, pp. 229-253 and 269-309.

numbers), the metal reproductions (396 numbers), the Asiatic seal cylinders (910 numbers), a part of the Chinese porcelains (1895), as well as a catalogue of old and new paintings, with 671 numbers, and one of spoons, with 300 numbers (1899). There are also published under the auspices of the museum engravings of some of the most important paintings, and (1885-1894) an atlas of the Cesnola collection of Cyprian antiquities, with 300 plates. A report is published every year; the thirtieth annual report, for 1899, with 68 pages.

There is at the head of the museum a director, who is under a board of trustees of 30 members, with a president of the corporation. There

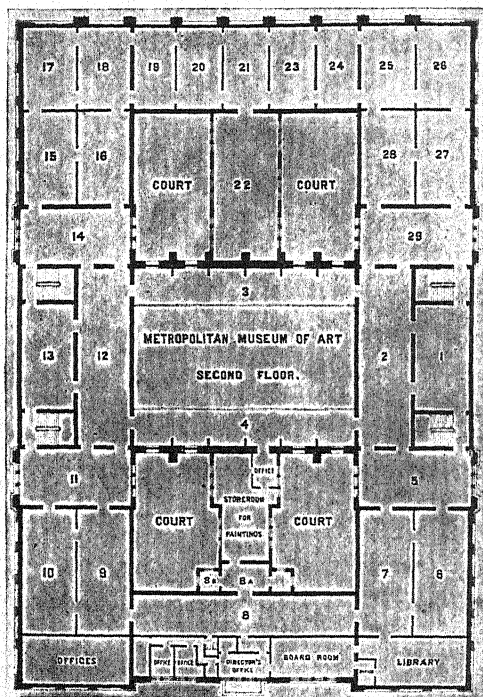
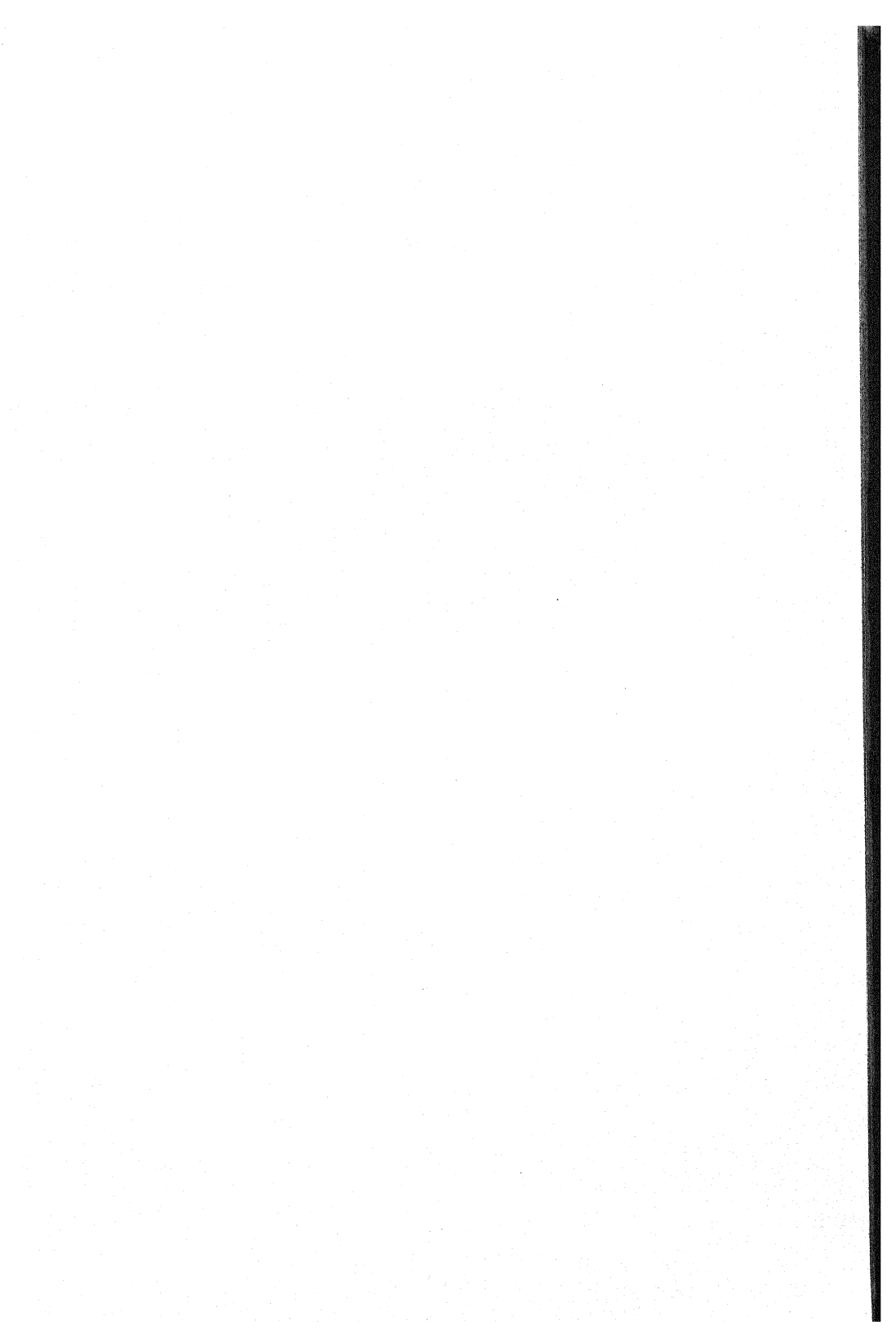
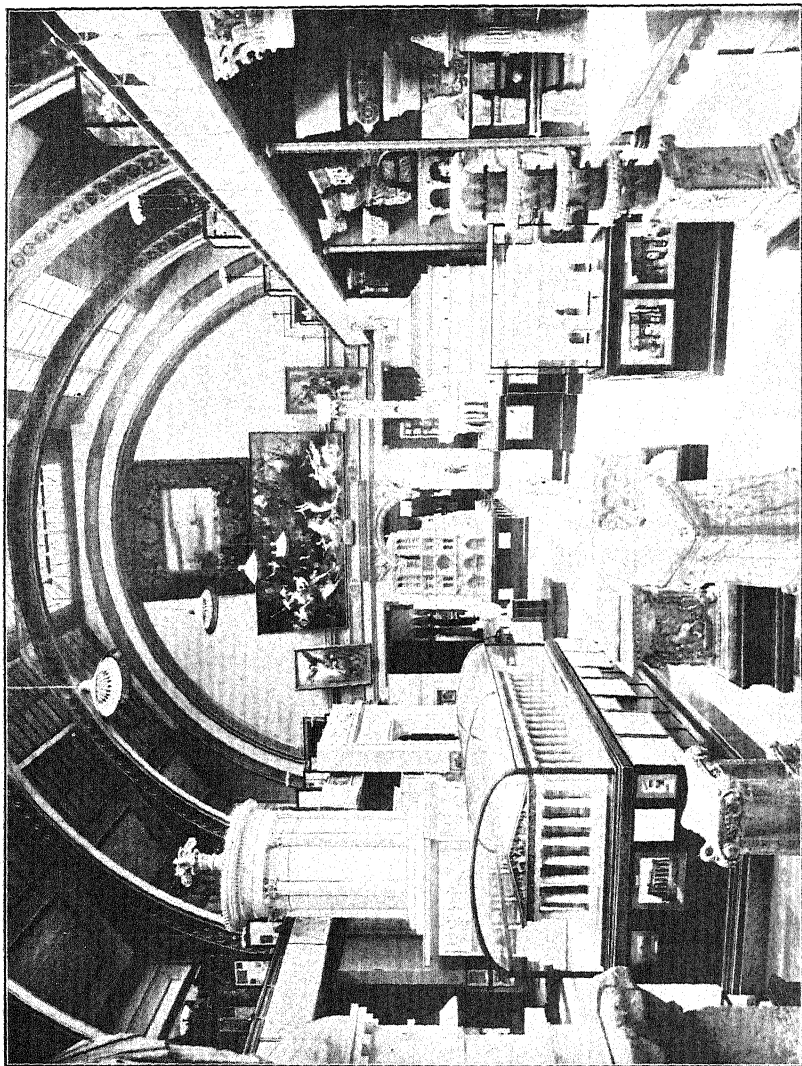


FIG. 11.—Metropolitan Museum of Art. Plan of second floor.

are also 9 different committees. The employees number about 100, of whom 3 are scientists. After the opening of the new building the number will be considerably increased. The working hours are from 7, 8, 9, or 10 in the morning till 6, or sundown when the sun sets before 6, and also while the museum is open in the evening. There is an hour intermission at noon. From 6 to 10 p. m., six watchmen are on duty, from 10 p. m. to 7 in the morning a night watch. More than 1,100 copyists, draftsmen, etc., made use of the collections in 1899. In winter free lectures on art are delivered every Saturday, beginning at 11 o'clock, which are attended mostly by women. Evening receptions for the members are also held.





METROPOLITAN MUSEUM OF ART.
Middle hall.

The center of the building is occupied by a large hall with skylight and galleries. In its four corners are somewhat narrow and steep wooden staircases, running to the second floor and to the cellar. In the latter are located a restaurant, and other conveniences. In the halls of the ground floor the windows are placed so high that cases can stand against the walls beneath them, an arrangement that looks well, but which does not appear everywhere to answer the purpose on account of the reflections and the deficiency of light. The floor is of white marble. Almost the whole second story is unsatisfactorily lighted by skylights, and in the picture galleries the light is further impaired by the plate glass, with which all the pictures are covered. The floor is made of parquetry, with an underlayer of cement one foot thick in the picture galleries as a protection against fire. In the summer the ventilation seemed insufficient. All the rooms can be lighted by electricity. The heating is by steam. The power house is located in a separate building.

In the middle hall is displayed a collection of casts and models of antique and mediæval architecture—among them, on a large scale, the Pantheon, Parthenon, Temple of Karnak, Notre Dame (this model cost \$20,000), Guild of the Butchers' House in Hildesheim, and many others, mostly with single parts of natural size beside them, and in every case photographs of the whole. In the other halls of the ground floor the collections from the Cyprian excavations are specially important. These demonstrate the Oriental influence on Græco-Roman art in vases, terra cottas, glasses, great stone sculptures, bronzes, etc. This most complete provincial collection shows in series the transitions from the prehistoric time, 1,200 years B. C. and earlier, to the Roman and Christian period of the fifth century, and is consequently very instructive. It cost \$60,000. A precious collection of glasses from the most remote times to the present also deserve particular mention.

On the second floor the modern portion of the picture gallery is first to claim the attention. A collection of equal value is not to be found in Europe. Only the following names need be mentioned: The two Achenbachs, Bastien-Lepage, Benjamin-Constant, Rosa Bonheur (Horse Market—which cost \$60,000 and was a gift to the Museum—and others), Bonnat, Bouguereau, Breton, Cabanel, Corot, Courbet, Couture, Defregger, Detaille (Defense of Champigny and others), Diaz, Gainsborough, Gallait, Gérôme, Hébert, Henner, Isabey, Israels, the two Kaulbachs, Knaus, Leighton, Makart, Manet, Max, Meissonier (Friedland 1807—which cost \$69,000 and was a gift to the Museum—and others), Menzel, Millet, Munkacsy, Piloty, Reynolds, Richter, Sargent, Scheffer, Stevens, Troyon, Turner, H. Vernet, Villegas, Voltz.^a The entire collection could not be

^a In 1900 Mr. Robert G. Dun bequeathed to the Museum a valuable collection of modern paintings worth \$250,000.

classified by the schools of art represented because individual collections must remain intact in accordance with testamentary provisions. The systematic arrangement of such collections is rightly considered as of less importance than their acquisition. Frequently, also, large sums are bequeathed for their preservation. In the other halls of the second story may also be noted the great collection of musical instruments of all peoples and periods (concerning which a profusely illustrated work by M. E. and W. A. Brown appeared in 1888),^a the ceramic collection, particularly from China and Japan, as also the Cyprian gold ornaments on exhibition in a room, which includes only precious articles of every kind.

A practical contrivance, which enables one to look through a series of volumes of photographs without exposing them to injury, should be mentioned. The books lie in glass desks, and when one wishes to turn over the separate leaves it is necessary to reach through an opening

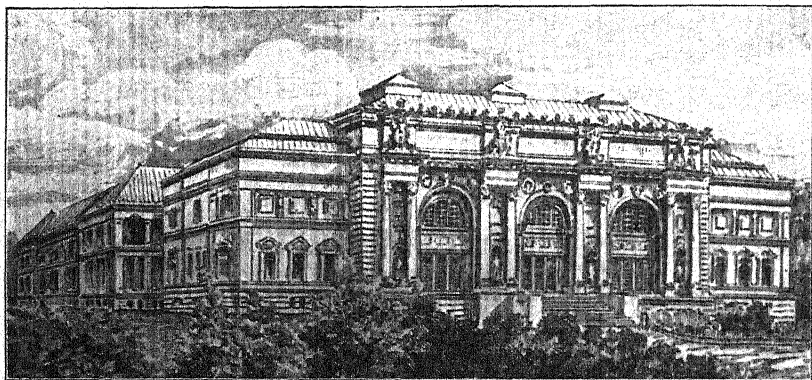


FIG. 12.—Metropolitan Museum of Art. Sketch of completed building as planned.

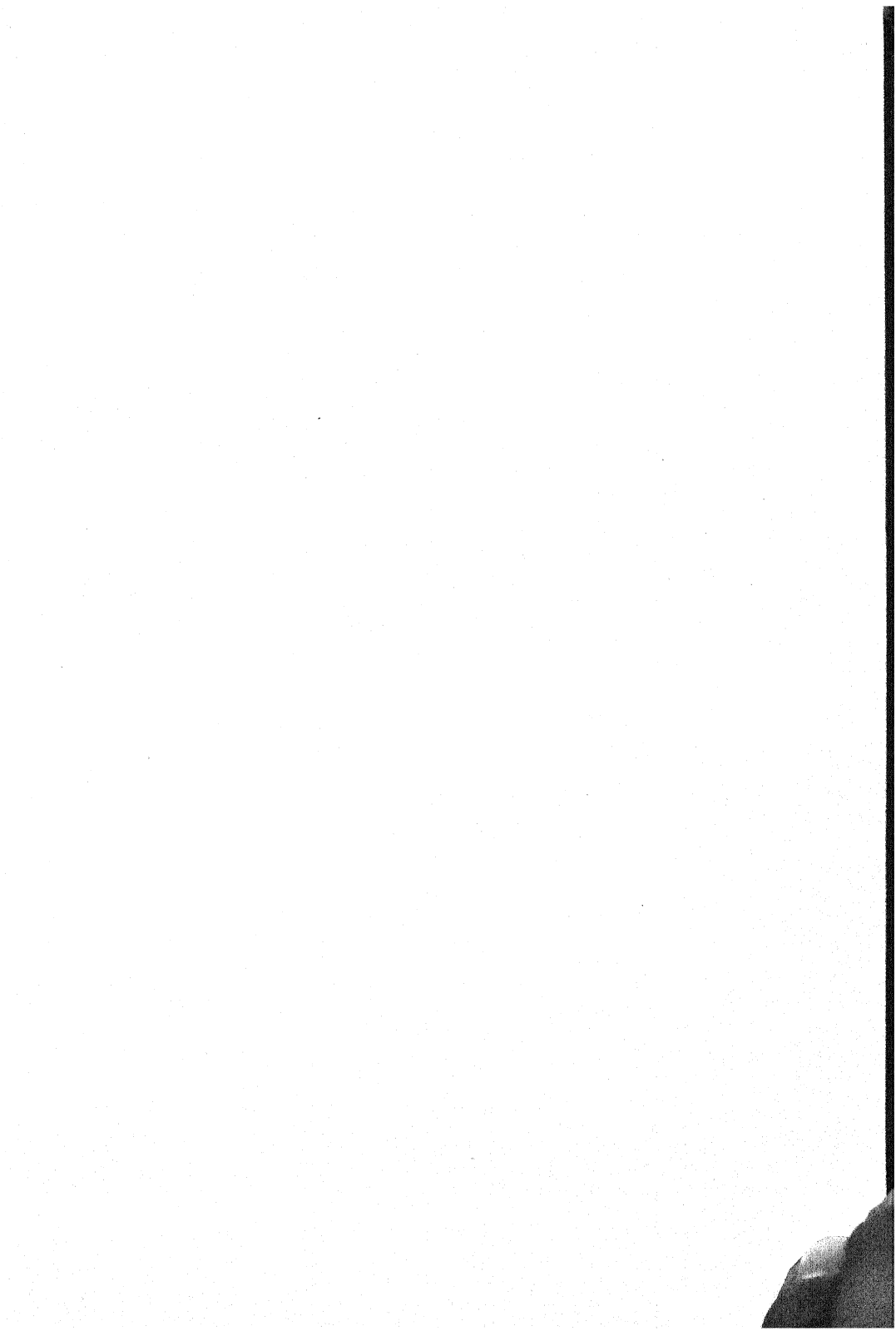
in front, which may be closed by means of a slide. A catalogue of the photographic collection may also be used in like manner.

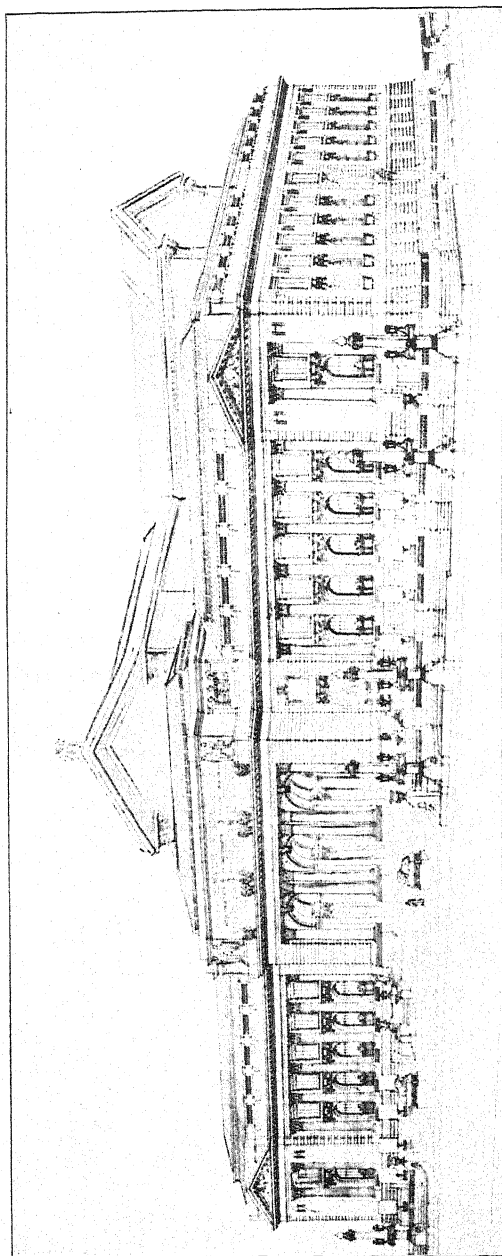
The value of this Museum (I have only laid stress upon a portion of it) is, notwithstanding its youth, very great, and its further development will be still more remarkable, as more objects of art are constantly flowing into the New World from the Old; so, in studying the art history of Europe and Asia, the collections of the United States may not in the future be overlooked.^b

^aTwo catalogues of this collection have since been published, with illustrations.

^bWe may here add some remarks which could not be so well embodied in the text:

The buildings lie in about the same direction as the Natural History Museum. The new building did not appear to me to be very happily joined to the old one. In the old building the entrance of the light through the windows is unnecessarily obstructed by the division of the windows into two parts and their shaded interior position. The exhibition in the great middle hall gives an unpleasant impression,





NEW YORK PUBLIC LIBRARY.

Sketch of building in course of erection.

4. NEW YORK PUBLIC LIBRARY—ASTOR, LENOX, AND TILDEN FOUNDATIONS.

This library originated in 1895 by combining the Astor Library, which was founded in 1849 and opened in 1854, and the Lenox Library, which was founded in 1870 and opened in 1878, with the Tilden bequest (1887) of \$2,100,000 and 20,000 volumes for a public library. From plans drawn by Carrère and Hastings there is now being erected in the best part of the city (Fifth avenue) a magnificent, monumental building, which is to be completed in about four years, at a cost of \$2,000,000 to be paid by the city through authority of the government of the State of New York in Albany. Five hundred thousand dollars were made available for the purpose in 1899 as a first instalment. As the two libraries named will soon disappear as such, only a few remarks concerning them will suffice.

The Astor Library, in Lafayette place, near the busiest portion of the principal street (Broadway), is supported by the bequests and donations of the Astor family, amounting to \$1,750,000. It is located in a two-story (in the middle portion three-story) building of red brick in Romanesque style, 200 feet long and 100 feet wide, which was built in three sections between 1853 and 1881. The Tilden Library is also installed here. The library consists of about 350,000 volumes, most of them of rather a general character, and 100,000 pamphlets, besides incunabula, manuscripts, and autographs. One peculiarity is noteworthy, that the books, arranged on the shelves according to subjects, are accessible to the public with certain limitations; but at present this

especially on account of the arched ceiling, like that of a railroad station, which is not relieved by the decorations. The unsystematic arrangement and the incompleteness of the collections is fully explained by their newness. Considering the magnificence of the collections it would be ungracious to dwell upon their faults, particularly as these objectionable conditions are improving from day to day. I mention the lack of good arrangement because it may partly be explained from the fact that many gifts have to be accepted and placed on exhibition in order not to lose patronage—an evil which is met with in many American museums. Such elements as do not fit in a collection can only be culled out after the lapse of many years.

The importance of the comprehensive and celebrated Cyprian collection can not be fully appreciated on account of its unscientific arrangement. The finds are separated (they probably were never kept together) and there exists no chronological sequence at all. The Oriental, Grecian, and Cyprian types in the vases, terra cottas, glasses, and stone sculptures are everywhere mixed together. Unfortunately no information whatever is given the visitor by labels. He does not get much more from the handbooks, since these are limited to brief descriptions. They are, indeed, welcome but not sufficient for an understanding of such objects. One must, therefore, regret not being able to derive the full benefit from this fine collection, even after several visits, which it should be capable of affording. The unsystematic arrangement of the collection is also particularly striking in the room on the second story devoted to precious ornaments. On the other hand, care has been bestowed upon harmony of arrangement in the entire museum, so that the general impression produced is one of pleasure and grandeur.

privilege is somewhat restricted on account of the overcrowded condition of the library. It may further be remarked that the newest acquisitions are placed together on a bookstand, and are freely accessible to readers. The furniture is of wood. Only a few iron shutters and fire extinguishers serve as a protection against fire. It is open daily, except Sundays and holidays, from 9 to 6, and is lighted at dusk by electricity. Children under 15 years of age are admitted when

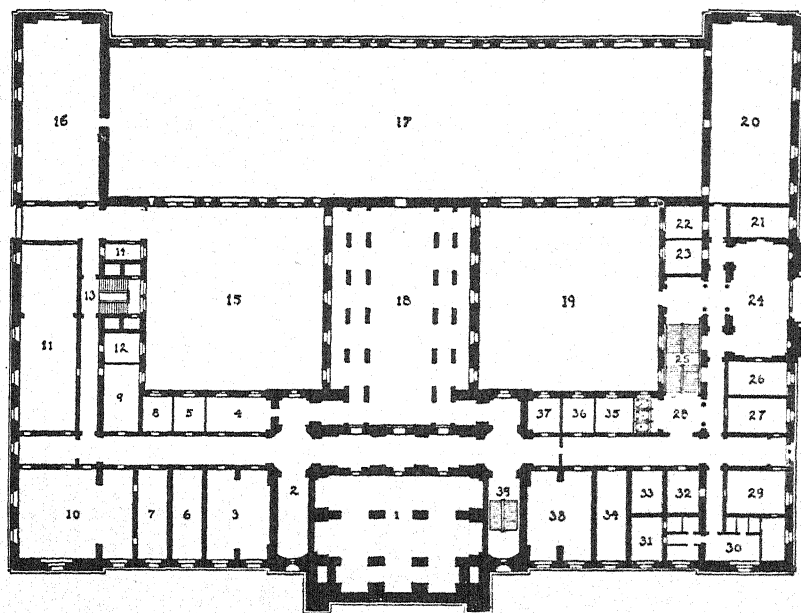


FIG. 13.—New York Public Library. Plan of basement.

BASEMENT PLAN.

- | | | |
|------------------------|----------------------------|---------------------------|
| 1. Storerooms. | 14. Watchman. | 27. Extra room. |
| 2. Telephone. | 15. Open court. | 28. Elevators. |
| 3. Lunch room. | 16. Packing room. | 29. Janitor's apartments. |
| 4. Workshop. | 17. Stack room. | 30. Janitor's apartments. |
| 5. Storeroom. | 18. Machinery. | 31. Stores. |
| 6. Lunch room. | 19. Lending delivery room. | 32. Stores. |
| 7. Bookbinding stores. | 20. Patents room. | 33. Stores. |
| 8. Toilet room. | 21. Bicycles. | 34. Stores. |
| 9. General stores. | 22. Parcels or coats. | 35. Scrub women. |
| 10. Bindery. | 23. Parcels or coats. | 36. Stores. |
| 11. Printing room. | 24. Entrance hall. | 37. Stores. |
| 12. Toilet room. | 25. Stairways. | 38. Stores. |
| 13. Stairways. | 26. Parcels or coats. | 39. Stairways. |

accompanied by grown persons. Umbrellas and canes are checked free of charge. Fees for this service are not expected. Books can be examined only in the library itself. There are 219 seats, a certain portion of one of the three great reading halls being reserved for ladies. From July 1, 1898, to June 30, 1899, 358,000 volumes were used by 85,000 readers (an average of 247 daily), apart from the reference library of 4,500 volumes, which is freely accessible to everybody

in the reading rooms. In the year named only 4 volumes disappeared. About 100 persons are employed in the library. It has published a few annual reports, several indexes and lists, and eight volumes of a catalogue with supplement (1861 to 1888), which, however, extends only as late as 1880.

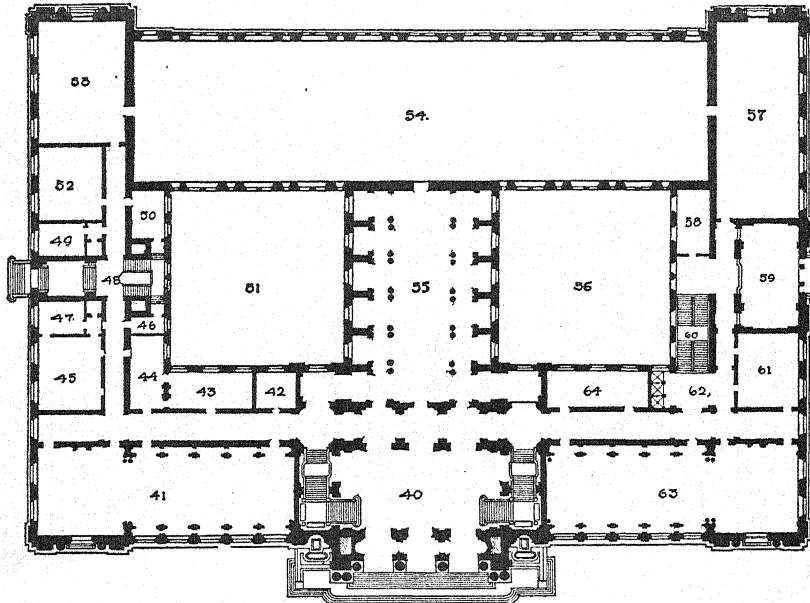


FIG. 14.—New York Public Library. Plan of first floor.

FIRST FLOOR PLAN.

- | | |
|------------------------------|--|
| 40. Entrance hall. | 53. Receiving room. |
| 41. Children's room. | 54. Stack room. |
| 42. Extra room. | 55. Exhibition room. |
| 43. Reception room. | 56. Upper part of lending delivery room. |
| 44. Reception room. | 57. Newspapers. |
| 45. Business superintendent. | 58. Extra room. |
| 46. Telephone. | 59. Entrance hall. |
| 47. Business superintendent. | 60. Stairways. |
| 48. Stairways. | 61. Reading room. |
| 49. Extra room. | 62. Elevators. |
| 50. Extra room. | 63. Periodical room. |
| 51. Open court. | 64. Library for the blind. |
| 52. Extra room. | |

The Lenox Library occupies a detached position in the best part of the city on Fifth avenue opposite Central Park. It contains also collections of different sorts. It is of two stories, fireproof, of white sandstone, with two one-story wings projecting at right angles. In the style of the École des Beaux Arts, it is recognized as one of the best specimens of later Parisian architecture, being of imposing appearance within and without, with the exception of the great covered steps leading to the entrance. The book stacks are of iron.

The library contains 150,000 volumes, particularly Americana, Bibles (10,000 volumes), Shakespeareana, and music, besides about 75,000 pamphlets, 600 manuscript volumes, 600 volumes of incunabula, 50,000 letters, 4,000 maps, etc. Nothing is lent out. There are 25 employees. The visiting hours, etc., are the same as in the Astor Library. After dusk the library is lighted by electricity and open to visitors. There are 108 seats. In 1898-99, 68,000 volumes were used by 26,000 readers

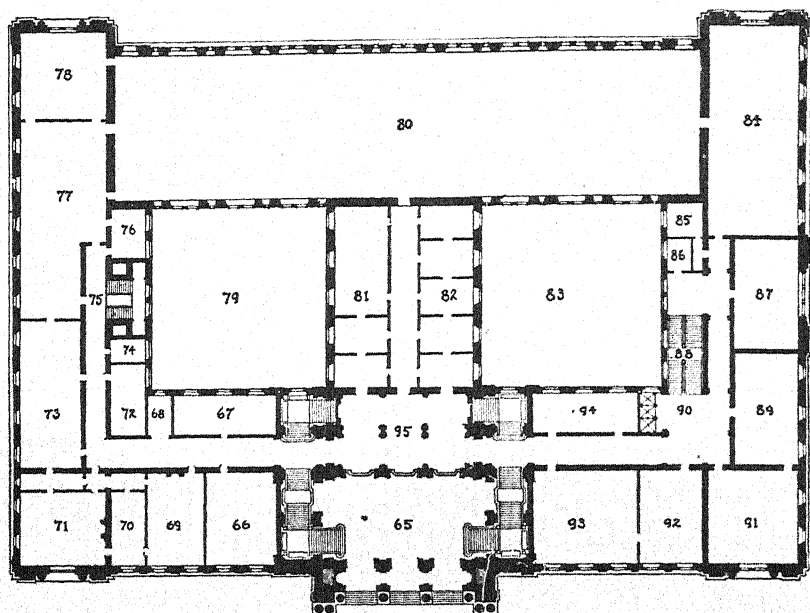


Fig. 15.—New York Public Library. Plan of second floor.

SECOND FLOOR PLAN.

- | | | |
|----------------------------------|----------------------------|---------------------------|
| 65. Upper part of entrance hall. | 76. Extra room. | 86. Toilet room. |
| 66. Class room. | 77. Cataloguing room. | 87. Special reading room. |
| 67. Special reading room. | 78. Accessions. | 88. Stairways. |
| 68. Extra room. | 79. Open court. | 89. Music room. |
| 69. Trustees' room. | 80. Stack room. | 90. Elevators. |
| 70. Director. | 81. Bibles. | 91. Maps. |
| 71. Director. | 82. Special reading rooms. | 92. Special reading room. |
| 72. Extra room. | 83. Open court. | 93. Special reading room. |
| 73. Order room. | 84. Public documents. | 94. Special reading room. |
| 74. Extra room. | 85. Toilet room. | 95. Gallery. |
| 75. Stairways. | | |

(an average of 84 daily), besides the use of the great reference library of 5,000 volumes in two reading rooms. Only two books were stolen and 25 mutilated in the two libraries together.

On the second floor there is a gallery of 400 paintings, for the most part modern—among them works by Becker, Bierstadt, Rosa Bonheur, Bouguereau, Brožik, Church, Constable, Copley, Corot, Delaroche, Detaille, Diaz, Gainsborough, Gérôme, Hübner, Huntington, Inness, Knaus, the two Koekkoeks, Landseer, Leslie, Lessing, Madrazo,

Meissonier, Munkácsy, Pine, Reynolds, Schreyer, Stuart, Troyon, Turner, Verboekhoven, H. Vernet, Vibert, and Wilkie. There is also a small collection of statuary and prints; and, finally, some minerals, ceramics, glass, etc., in wooden cases. The number of visitors to the museum was 34,000.^a

The Lenox Library published or printed between 1879 and 1893, seven Contributions to a Catalogue of the following contents: The Hulsius collections of voyages; the Jesuit relations; the voyages of Thévenot; the Bunyan, Shakespeare, Milton, and Walton collections; also the letter of Columbus on the discovery of America (1492), as well as catalogues of paintings of the Lenox and Stuart collections, and twelve short title lists.

The new library, which embraces the two just described and the Lenox collection, and has been administered as the new library since 1896, is controlled by a director, under a board of trustees of 21 members, with a president at its head, and also 5 committees, nominally controlled by the University of the State of New York. (See Albany.) All the following applies to the Astor, Lenox, and Tilden libraries together. The New York Public Library will soon be increased by a great distribution section, which will include all the public libraries belonging to the city. New York has too long been without such a central library. More than 600,000 books and pamphlets are now accessible and about 75,000 are not yet installed.^b In 1899 more than 115,000 readers called for over 500,000 volumes, without including the reference library—an average of 347 readers daily. In the year named the extraordinarily large increase of almost 165,000 volumes and pamphlets was recorded. The average annual increase is now estimated at over 50,000 numbers; 3,925 periodicals were received,^c of which 1,207 were American and 909 German; 819 of these were donations. There were 148,000 parts of periodicals consulted during last year, an average of more than 500 daily.^d The annual increase amounts to 6,400 numbers, including 48 dailies, 543 weeklies, 1,075 monthly and 580 yearly papers.^e All of these are purchased. In 1899 more than 91,000 volumes and pamphlets were catalogued on 225,000 cards. The catalogue of the reading room, accessible to all, contains

^aNew York has three public picture galleries: Those of the Metropolitan Museum, Brooklyn Institute, and Lenox Library. Of prominent private galleries I may mention those of C. T. Yerkes, H. O. Havemeyer, G. W. Vanderbilt, G. Gould, and W. A. Clark.

^bIn 1902 there were 777,768 books and pamphlets in the library. The Berlin Library has over 1,000,000 volumes and manuscripts, the Paris Library nearly 3,000,000, the British Museum from 4,000,000 to 5,000,000.

^cIn 1902, 4,495.

^dIn 1902, 226,396 current periodicals were called for, being a daily average of 750.

^eIn 1902 the average of separate numbers of periodicals (excluding annuals) received daily was 280, the total number for the year being 86,800.

up to the present 600,000 cards, with author and subject entries in alphabetical sequence. The author and subject catalogue now includes only half of the library. Two hundred thousand volumes and pamphlets are covered by an author catalogue only, while 50,000 are still uncatalogued. The catalogue system is new and will be published later. The library now makes a specialty of official publications of governments and public administrations of all countries, as well as

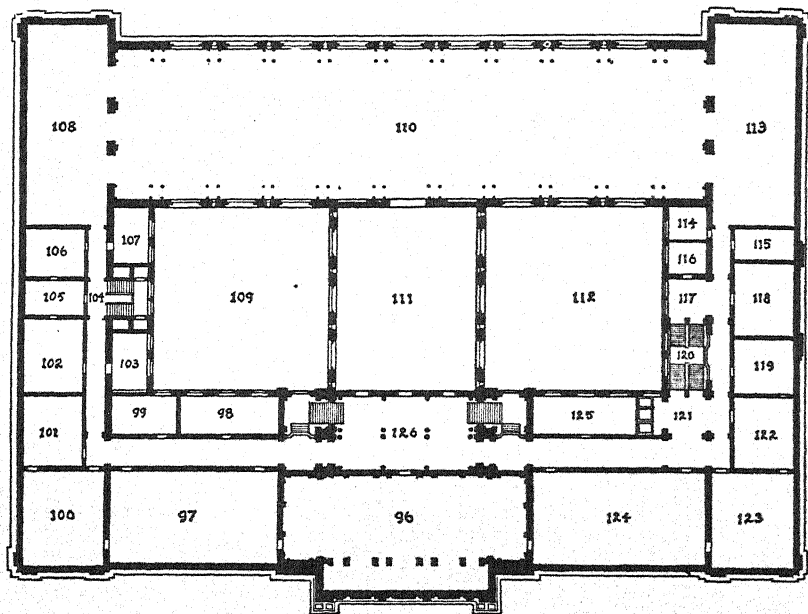


FIG. 16.—New York Public Library. Plan of third floor.

THIRD FLOOR PLAN.

- | | | |
|--------------------------------|--------------------|----------------------------|
| 96. Stuart collection. | 107. Extra room. | 117. Stair landing. |
| 97. Collections and exhibits. | 108. Reading room. | 118. Special reading room. |
| 98. Special reading room. | 109. Open court. | 119. Special reading room. |
| 99. Toilet room. | 110. Reading room. | 120. Stairways. |
| 100. Collections and exhibits. | 111. Reading room. | 121. Elevators. |
| 101. Collections and exhibits. | 112. Open court. | 122. Picture gallery. |
| 102. Manuscripts. | 113. Reading room. | 123. Picture gallery. |
| 103. Extra room. | 114. Extra room. | 124. Picture gallery. |
| 104. Stairways. | 115. Photographer. | 125. Special reading room. |
| 105. Manuscripts. | 116. Toilet room. | 126. Hall. |
| 106. Manuscripts. | | |

everything relating to societies. A monthly bulletin, the fourth volume of which is in course of publication, which annually amounts to 500 pages, gives an account of what is done in the library, specifies monthly the most important acquisitions, contains bibliographies, copies of documents and letters, etc. A handbook of 64 pages relating to the New York Public Library was recently published (1900). Tolerably full instruction in library science is also given.

With so comprehensive a programme, such lofty aims, and consider-

ing the inclination of the Americans toward greatness, it need scarcely be said that the new building has been planned on a corresponding scale. It is about 350 feet long, 250 feet wide, 68 feet high in front, 98 feet in the rear (that is, about the size of the German Reichstag building), with two open courts, each 81 feet square. It consists of three stories and a basement, connected with one another by elevators and stairs. It is fireproof throughout. This library differs from many others in not having the main reading room situated centrally in a lofty, spacious hall, as is generally the case, but in the back part of the topmost story, occupying, in several sections, almost the entire length of the building.^a It is also noteworthy by having the iron bookstacks, seven stories high, located under this main reading room, beginning in the basement. They are 270 feet long, 72 feet wide, and altogether 53 feet high, affording space for 1,250,000 volumes, while another quarter of a million can be provided for elsewhere. The delivery desk for these is located in the middle of the main reading rooms, connected with the underlying bookstacks by means of book lifts. The rooms for lending books outside of the building are situated in one of the courts in the basement and ground floor. A possible extension of the library to a capacity for 5,000,000 volumes is provided for by the park lying behind the building. There will be about 800 seats in the main reading room, besides about six special study rooms in the third story and seats in the special libraries (Government publications, Oriental literature, sociology and political economy, mathematics, physics, chemistry, maps, music, Bibles). There is also a reading room for children and a newspaper and periodical room in the second story. The whole manuscript section is as a safe for itself. The power plant will be located outside of the building. The other details may be seen in the ground plans.

The land, buildings, and books of the united libraries are worth about \$3,600,000. There is, besides, an invested fund of \$3,000,000, yielding \$125,000 interest, seven-eighths of which is applied to administrative purposes. After the completion of the new building, however, ample provision will be made by the city for running expenses.^b

There can be no doubt that the New York Public Library, under the administration of Dr. John S. Billings, who has been director since 1896, will become a model institution, and, supported by the liberality of the rich New Yorkers, it will be a magnificent ornament to the great city.

^a This is also the case in the Chicago Public Library.

^b Since Mr. Carnegie has, in 1901, presented \$5,200,000 for 65 branch libraries in New York, the task of the public library has been enormously increased, as they are all to be under the administration of the New York Public Library. Already, in 1902, 2,000,000 books were in circulation for home use from 17 branch libraries.

5. COLUMBIA UNIVERSITY.

The founding of King's College by royal patent of George II dates back to 1754—before the Declaration of Independence of the United States of America, in 1776; therefore the university is one of the oldest organizations in New York. In 1897 it was removed to Morningside Heights, in the northern part of the city, between One hundred and sixteenth and One hundred and twentieth streets and Tenth and Eleventh avenues, except that the medical faculty (College of Physicians and Surgeons, founded in 1807), and incorporated in 1891, remained in its three buildings in Fifty-ninth street, 3 miles away where it had in 1887 acquired model new buildings and furnishings, provided almost entirely by the Vanderbilt family at a cost of \$2,500,000, among them an anatomical laboratory for 400 students, a model of its kind. I here treat only of the new university, which was erected in a uniform style from maturely considered plans, and, besides many other advantages, already before completion, possesses two especial attractions—the power house and the library. The university occupies its third location since it was founded as King's College, almost one hundred and fifty years ago, and the medical faculty its sixth. This frequent removal might at first sight appear to be a disadvantage, but has in fact proven to be a great advantage, because, pushed farther and farther outward by the growth of the city, the new buildings could in their new locality always be made to conform to the altered conditions, whereas elsewhere such new buildings can generally be acquired only after long periods.

The university occupies an isolated position on an elevated tract, where presumably it will suffice the wants of the next generations, and even after the adjacent portions of the city are more closely built up, it will still occupy a comparatively open position, not in direct contact with the city's noise and traffic. It occupies historical ground, as a battle was fought there in 1776 during the war of the Revolution against England. In 1812, also, fortifications were erected here during the second war with England. After 1825 an insane asylum occupied the site. In 1892, at a cost of \$2,100,000, an area of $16\frac{1}{2}$ acres was acquired by the university on this rocky hill for a new site. The nature of the ground admitted of making a plateau 750 by 575 feet—that is, somewhat more than three-fifths of the entire tract—150 feet above the near-by Hudson, and 25 feet above the streets; in size about the same as the Dresden "Zwinger," with its surrounding gardens. It is, therefore, not so very large and is smaller than the site of the Natural History Museum, 2 miles away. In 1893 the university purchased at the Chicago World's Fair for \$3,500 the university plans sent there by the Prussian educational department, which now hang on the walls of the architectural section of the library; and in 1894 it accepted the building plan

worked out by the architects, McKim, Mead & White, for the buildings in the Italian Renaissance style. According to this plan 14 separate buildings lie to the right and left of the library in four groups,

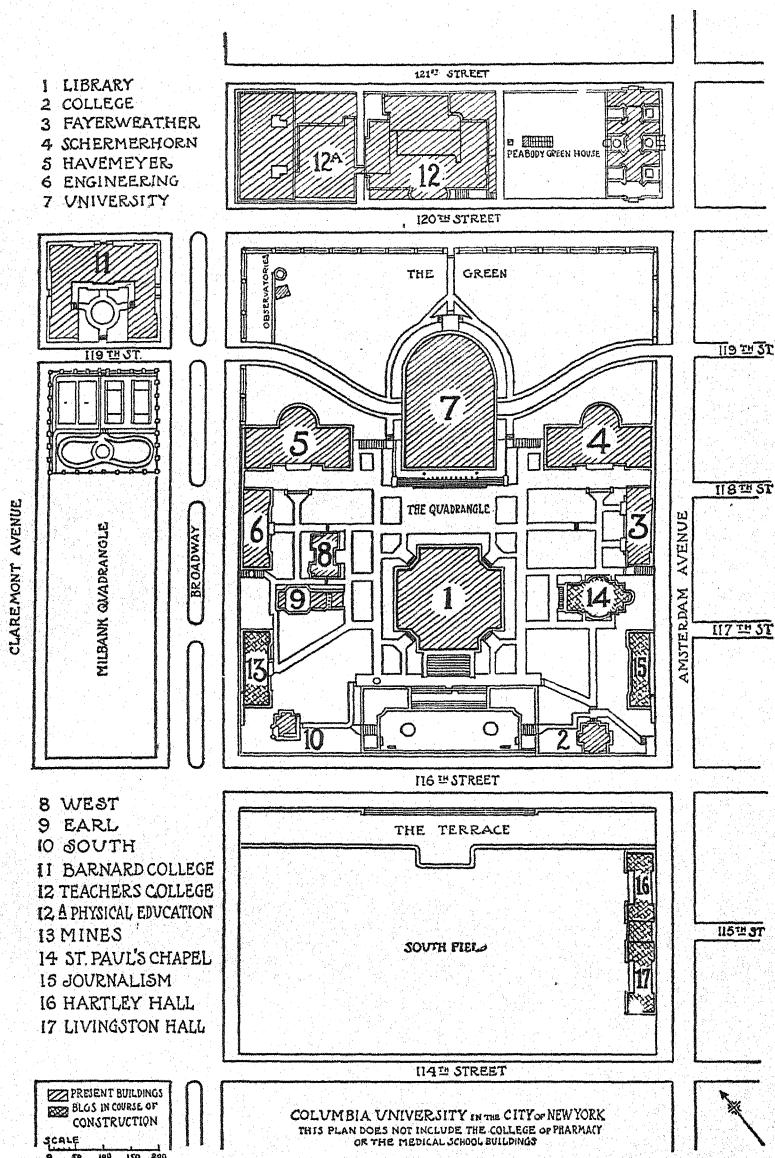


FIG. 17.—Columbia University. General plan of University buildings.

embracing as many courts. Behind it is the University Hall, 300 feet in length, containing a theater (for 2,500 persons), a dining hall (for 600 persons), the gymnasium, and the power plant for the entire univer-

sity. A handsome model of University Hall is exhibited in the Metropolitan Museum of Art, a mile and a half away. Only the front part of the hall rests on the plateau itself, the main portion of the building extending along the back slope of the plateau, which has a steep descent of 38 feet, so that in the rear the structure rises to an imposing height of 136 feet, while in front it is 69 feet high. These lower-lying portions of the site, affording a park-like green with old trees, are to be inclosed by four dormitories." The buildings are 69 feet high, the outer ones having four stories and two basements, which is made possible by the sloping nature of the ground.

Four of the great outlying buildings for lecture rooms, laboratories, and collections are completed; also the library and the power plant of the university hall, and the gymnasium with its baths. The foundation, stairs, balustrades and the like are of granite; the library is of white sandstone; everything else is of red-brick construction with sandstone trimmings. The walks are paved with red brick. The whole makes an imposing as well as an agreeable impression, gay in summer from the green color of lofty trees and grass plats. Everything is fireproof; the framework is of iron; the floors, walls, and roofs are of hollow brick; the stairs are of stone or of iron and stone. The iron pillars rest in sheet-iron sockets, which are filled with loose asbestos. The doors and window frames are of wood; the windows are of plate glass. Everything is done according to the expressed principle that the best is not too good and is in the end the cheapest.

The buildings hitherto erected cost \$4,250,000;^b those yet to be put up will require \$5,500,000. The total cost of the university buildings will amount to \$15,000,000,^c and they will accommodate 6,000 students and 600 teachers. Already the aggregation of buildings—Columbia University, National Academy of Design, Grant Mausoleum, St. Luke's Hospital, and St. John's Cathedral—splendidly situated on the high bank of the Hudson in the midst of carefully tended parks, is regarded as the future "Acropolis of the New World."

Columbia is exclusively an endowed university, and although it has the authorization of the State of New York for its founding, it has never received a State appropriation. That such a considerable sum for a university can be raised entirely by private subscription is characteristic of Americans and is an argument for the social justifica-

^a See illustrations in *Columbia University Quarterly*, I, 1899, p. 149. Two five-story buildings are planned 156 feet in length, and two 200 feet in length and 40 feet wide, which will accommodate altogether about 450 students, and will cost about \$750,000.

^b An exact statement of the cost may be found in the report of the president of October 3, 1898, reprinted in report of the Commissioner of Education, 1897-98, II, p. 1797, Washington, 1899. See also *Science*, XIII, p. 116, January 18, 1901.

^c The Strassburg University buildings cost \$3,750,000.

tion of their proverbial wealth." In America the obligations imposed by the position of wealth are well discharged. Columbia is governed privately by self-chosen trustees, and is only nominally subject to the control of the regents of the University of the State of New York in Albany. It now has an annual income of \$400,000 from its endowment of \$12,000,000, and tuition fees amounting to \$375,000. Its current expenses amounted in 1899 to \$837,500^b; such a deficit of \$62,000 is, however, of no consequence, since persons are always found who make it good. Nor is a momentary debt of \$3,000,000 very oppressive, as it will soon be paid. In 1899 a number of benefactors together contributed \$75,000 for current expenses alone and \$500,000 for endowment funds, besides a hospital worth over \$500,000 with an endowment of \$375,000. The current annual expenses of the University of Berlin amount to \$750,000; those of the University of Leipzig, \$625,000, of which \$500,000 are appropriated by the Royal Saxon Government. The city of New York, with its 4,000,000 population, has about the same number of inhabitants as the Kingdom of

^a I cite only a few of the great university endowments. The dates given in parentheses indicate the year of founding of the universities mentioned. The Stanford family gave \$30,000,000 (1891); Johns Hopkins (1867), \$3,750,000; J. G. Clark (1887), \$3,000,000; W. C. de Pauw (1837) and J. B. Colgate (1819), \$1,500,000 each; J. N. and H. Brown (1764), \$750,000 each for the university bearing the name of these founders; J. D. Rockefeller (1866), \$10,000,000 for Chicago; S. Cupples and K. S. Brookings (1900), \$5,000,000 for Washington in St. Louis; the Vanderbilt family, \$3,750,000 for Vanderbilt University (1872) and Columbia, in New York; J. Rich and A. Packer, \$2,000,000 each for Boston (1869) and Lehigh, in South Bethlehem (1866); J. C. Green, \$1,750,000 for Princeton (1746); Seth Low and J. Loubat, \$1,500,000 and \$1,250,000, respectively, for Columbia (this university received in the last ten years endowments amounting altogether to \$7,000,000); E. Cornell, H. W. Sage, and O. H. Payne, \$3,500,000 for Cornell (1865); J. Lick, \$750,000 for Berkeley (1868). Yale, in New Haven (1701), received \$5,000,000 from different donors; Wesleyan University, in Middletown (1831), \$2,000,000; Cincinnati (1819), \$1,500,000; Harvard, in Cambridge (1636), receives on an average \$1,000,000 to \$1,250,000 every year (last year \$1,625,000), etc. G. Peabody gave \$6,000,000 for various scientific institutions; D. B. Fayerweather, \$5,250,000. This makes a total of between \$100,000,000 and \$125,000,000, and yet is only a fraction of such gifts for universities and scientific institutions, as may be seen from the list given in the New York World Almanac, 1900, p. 310. In the year 1899 alone about \$75,000,000 were donated for universities, colleges, schools, and libraries. E. D. Perry (Education in the United States, edited by N. M. Butler, Albany, 1900, p. 304) says: "It is truly encouraging for the future of education in America that so many of her millionaires are willing to give freely of the fortunes that they have accumulated, and that those who give the most should set the example of intrusting the application of the funds to those who best understand the needs to be met." [The above lists were made up in 1900, but would be considerably enlarged to-day. Mr. Carnegie alone has given away \$100,000,000.]

^b These figures are only approximate. I may mention for comparison that the annual current expenses of Johns Hopkins University, in Baltimore, amount to only \$200,000.

Saxony. Leipzig has 3,500 students, Columbia University about 4,000, of whom, however, only about 2,000 correspond to our students. These remarks are merely thrown in without any desire to compare the two universities.

There is an extraordinary difference among American universities. About twelve or fifteen correspond to our twenty-one German universities, and even these can not be compared without hesitation, because they combine with the university to a greater or lesser degree some of our "gymnasium" classes, and stand, moreover, upon quite different stages of development. Almost every American university has a college,^a which in its first two or three years corresponds somewhat to our "obersecunda" and "prima," and only in its last years to the first year of our universities. On leaving college the student, after passing an examination, receives a degree of bachelor of arts, or the like, and, if he so chooses, then enters the university proper, which is organized into faculties ("schools") as among us. The individual who leaves college in order to begin his life work possesses, therefore, a higher education than our young men who leave the gymnasium for the university. After attending the university for two years the student obtains the degree of master of arts, or the like, and after one or more additional years of study, the degree of doctor. The students at American universities are accordingly divided into undergraduates (in the college), graduates or postgraduates (university students in the more restricted sense), and special students. The latter are either nongraduates or persons who, after completing their college course, pursue no regular faculty studies, but immediately apply themselves to special studies, which lie without the scholastic organization. The American student is permitted to pursue special studies earlier than the German student, and the students in general have a relatively free choice of their lectures, as in the German universities, which is also already more or less the case toward the close of the collegiate course.

A person thoroughly acquainted with German and American universities, Prof. H. Münsterberg, of Cambridge, Massachusetts, once declared (*Der Western*, Chicago, December 3, 1893), with regard to Harvard, that the examination for the degree of doctor of philosophy as the last period of the graduate school (that is, the philosophical faculty) represents a stage of scientific maturity far above the level of the average German doctor; that the examination for doctor in Harvard was more like the German examination, which admits the young scholar to the office of an academical teacher ("Privatdocent"), than

^a Lately students have been admitted to Columbia without knowledge of the Latin language, so that there the rudiments are also taught.

like the German examination for the degree of doctor.^a This equality with German universities applies, however, only to a very small proportion of the 150 American scholastic institutions that call themselves universities, to say nothing of the 350 colleges.^b Besides Harvard in Cambridge it may perhaps apply to the following: Chicago, Columbia in New York, Yale in New Haven, Cornell in Ithaca, Pennsylvania in Philadelphia, Michigan in Ann Arbor, Wisconsin in Madison, California in Berkeley, and Stanford in California. Johns Hopkins in Baltimore has virtually dispensed with a "gymnasium"-like collegiate preparation, and consequently most nearly resembles a German university, to imitate whose organization an avowed tendency exists in many American universities. Princeton, indeed, possesses a college, but only a philosophical and theological faculty. The twelve here mentioned (Harvard, Johns Hopkins, Yale, Columbia, Cornell, Chicago, Stanford, California, Princeton, Michigan, Wisconsin, and Pennsylvania) have quite recently formed a closer union. Clark University in Worcester comprises a philosophical faculty with 11 teachers and 34 students (1900), and recognizes the pursuit of science as its first object, with teaching as somewhat subordinate.^c Thus every one of the American universities ought to be especially characterized. We can not in general speak of the universities of the United States as we do of the German universities. These matters are known to every educated American, and nothing is more preposterous than to look at all of these universities of the Union as alike. I must let the matter rest here with these few general remarks, but refer the reader particularly to the chapter *The American University* in the work entitled *Education in the United States*, edited by N. M. Butler, Albany, J. B. Lyons Company (1900), I, pages 249-319.

Columbia University has the following six special faculties to govern Columbia College:

Juridical faculty, school of law, for common law.^d

Medical faculty, school of medicine.

Philosophical faculty, school of philosophy, for philosophy, philology, literature.

^a Quite recently, and after a longer experience in America, Professor Münsterberg confirms this statement in the following words: I have no doubt that the doctor degree in Harvard ranks higher than in any German university. It occupies a medium place between the German doctor examination and the examination for the position of academical teacher, in part also corresponds to the German civil-service examination. (*Zukunft*, No. 35, 1900, p. 389.) Prof. P. Haupt, of Baltimore, in a letter addressed to me confirmed this with reference to Johns Hopkins.

^b For a better understanding of this subject, Münsterberg's remarks in the above-cited excellent paper, *American Universities*, in *Zukunft*, No. 35, 1900, p. 385, may be consulted.

^c *Science*, 1900, p. 621.

^d See also *Columbia University Quarterly*, I, 1899, p. 135.

Political economy faculty, school of political science, for history, national economy, public law.

Natural science faculty, school of pure science, for mathematics and natural science.

Technical faculty, school of applied science, for mining and metallurgy, chemistry, engineering, architecture.^a

Here, therefore, we have a technical high school combined with the university. The tendency to spread out in this direction has recently developed more or less among our German universities. Columbia College is not strictly separated from Columbia University. Undergraduates—that is, students of the college—may take certain courses of the university.

Two other institutions are closely connected with Columbia, namely, Barnard College and Teachers' College.^b Both are near by, separated only by the width of a street, but on their own ground. Barnard College is intended for women, and corresponds to Columbia College for men. Teachers' College is a seminary for male and female teachers on a university basis. Barnard College was founded and endowed in 1889 by former President Barnard of Columbia. It is an independent corporation, but the courses of instruction and examination are prescribed by Columbia, and Columbia professors lecture in the institution besides others appointed by Columbia. Students of Barnard College may also attend certain advanced lectures in the university and take university degrees. Teachers' College was founded in 1888 and united with the university in 1898. Certain lectures may also be attended by Columbia students. These two colleges, therefore, form part of the university, have the university president as president of each, but are financially quite independent. Their budgets are not included in the figures given above.^c Their students, however, are included in the foregoing estimate. Barnard College has 317 students, and Teachers' College 365, besides 750 whose relations to the establishments are not so intimate, while their professors also lecture outside of the colleges. The university itself had in 1899–1900 2,456 students, of whom 460 were undergraduates, 1,996 graduate students, and 30 nongraduates, making a grand total of 3,888.

Columbia is less intimately connected with the Union Theological Seminary on Sixty-ninth street, about 3 miles distant; with the American Museum of Natural History, where, among others, the laboratories for anthropology and paleontology are located, with the Metropolitan Museum of Art, both in Central Park, about 2 miles distant, and with the New York Botanical Gardens in Bronx Park, about 5 miles from the university buildings, where also the her-

^a See also *Columbia University Quarterly*, I, 1899, p. 241, and II, 1900, p. 242.

^b For the latter see also *Columbia University Quarterly*, I, 1899, pp. 323 and 342.

^c Quite recently \$1,000,000 were donated to Teachers' College for dormitories.

barium and a portion of the botanical library of the university are deposited, and where the more advanced botanical laboratory courses are held. In July and August summer courses of thirty lectures each on ten topics are delivered in the university. At the instance of the New York Chamber of Commerce, a commercial high school will soon be organized. Finally, during the winter, the professors give free public courses of lectures in the two museums above mentioned and in Cooper Union, a great free institution for the dissemination of learning, with 3,500 students and 2,000 daily readers in the library connected with it. Numerous scientific societies hold sessions now and then in the rooms of the university, such as the National Academy of Sciences, the American Association for the Advancement of Science, with its nine sections, and also the American Astronomical and Astrophysical Society, the American Chemical Society, the American Mathematical Society, the American Physical Society, the Geological Society of America, the American Entomological Society, the American Forestry Association, the American Society for the Promotion of Engineering Education,^a and others. It is, therefore, a center of greatly divergent and broad intellectual interests.

At the head of the university is a president, under a board of 22 trustees, who form a self-perpetuating body and appoint the president. At the same time 5 committees on finance, buildings, promotions, instruction, and library officiate. The university employs 85 regular and 14 special professors,^b 240 assistants, etc., and 12 administrative officers, besides 150 persons under the superintendent of buildings,

^a New York itself is the seat of many scientific societies. Only the following need be named (from *Education in the United States*, edited by N. M. Butler, Albany, II, 1900, p. 872): The New York Academy of Sciences, founded in 1817, whose four sections (astronomy and physics, geology and mineralogy, biology and anthropology, and psychology and philology) meet monthly. (On the 23d of October, 1899, I attended an interesting session of the section for anthropology and psychology, which was held together with the Anthropological Club, with Prof. Franz Boas as chairman.) The academy also holds general sessions. Every year a reception is given, with demonstrations of scientific progress. It publishes octavo annals and quarto memoirs. Its library contains 18,000 works. A scientific alliance includes the academy and the following local societies: Torrey Botanical Club, New York Microscopical Society, Linnean Society of New York, New York Mineralogical Club, American Mathematical Society, New York section of the American Chemical Society, and the New York Entomological Society. It is the intention to erect a central building for this scientific alliance. The Preliminary List of American Learned and Educational Societies, published by the Bureau of Education in 1896, enumerates 62 scientific societies in New York.

^b The position of the "Privatdocent" is not known in Columbia, nor in any American university. I may mention that the professors of American universities generally take a year's leave of absence on half pay every seven years, but may divide such leave of absence through several years. This may have turned out to be a necessity, inasmuch as a prolonged journey in Europe is of the greatest importance to most of them. A similar privilege ought, however, also to be granted to the European professors.

among them technologists, since a portion of the new installations and the greater part of the repairs are made on the premises. The university, therefore, employs a staff of over 500 persons, all told.

Each student pays \$125 to \$200 annually for all instruction. The university authorities estimate his annual expenses in New York at between \$375 and \$825, according to his requirements—\$550 for medium accommodations." Eighty-five fellowships and scholarships are bestowed annually, amounting to almost \$60,000, and whoever has attained the degree of doctor of philosophy in Columbia may continue his work in the laboratories free of charge. These fellowships and scholarships vary between \$125 and \$850, most of them \$500, and the holder of fellowships need pay no college fees. A committee of professors aids poor students in order that they may support themselves while pursuing their studies as private teachers, translators, writers, evening school instructors, traveling companions, stenographers, typewriters, etc. The student who asks this aid is respected all the more for it by his colleagues.

The university annually publishes a catalogue, which contains 400 to 500 pages of accurate information, a report of the president, of over 100 pages, catalogues of lectures of each faculty with all possible special data for the students, comprehensive pamphlets of 100 or more pages; and also, beginning in 1899, a Quarterly, which treats only of affairs relating to the university proper. A bulletin appeared from 1890 to 1898. In 1897 a small album of 48 pages was published with many illustrations and plans, entitled "Columbia University," which gives an excellent idea of the whole establishment. Finally, from 1894 to 1900, 16 volumes of a scientific character have appeared in quarto, octavo, and duodecimo (each volume complete in itself), together with serial publications of eleven different departments (contributions, memoirs, or studies), and five periodicals, which are conducted by members of the faculty.

The power plant.—It was planned to build a power house for heating, lighting, ventilating, water, electricity, mechanical power, compressed air, etc., directly on the banks of the Hudson River, but a short distance from the university in a straight line, in order that coal could be unloaded directly from the vessels into the boiler house. The pipes and cables were then to have been led up through a tunnel, but this project was not permitted by the city authorities as the nearby residents thought themselves damaged by such a plan. In consequence of this a handsome boathouse was erected on the ground already

^a In Harvard the expenses are estimated at \$500 to \$600, in Yale \$700, in Philadelphia \$450. Each student costs the American universities from \$125 (at Vassar College for women) to \$400 (Leland Stanford Junior University); in the European universities the cost averages \$175, as estimated from a total expenditure of about \$5,750,000 for 33,500 students.

purchased on the banks of the river, the gift of a patron, and the engine house was built under the University Hall in a room 165 feet long, 100 feet wide, and 33 feet high. For this purpose, together with great tunnels to connect all the buildings, the drains, cellars, coal bunkers, and ground floors, more than 80,000 square yards of rock had to be quarried. The machinery is driven by a 4,000 horsepower engine, that requires 13,000 tons of coal a year, 4,000 of which can be stored at one time. In order to protect the buildings from the vibrations of the powerful engines, their foundations were all united on a single wall base separated from the foundations of the buildings; this had the desired result.

The steam-heating apparatus is installed according to the so-called direct-indirect system (that is, radiant heat and warmed ventilating air), and goes through thousands of feet of pipe. The exhaust steam from the engines suffices for heating the library and the University Hall. Automatic thermostats regulate the temperature of all the rooms. The ventilator drives 1,250,000 cubic feet of air a minute through the building. Nowhere is it renewed less than six times an hour, in some rooms twelve times. The piping for water, gas, compressed air, vacuum, etc., is unusually extensive, the chemical institute alone having over 6,000 discharge pipes and connections. Equally enormous is the length of wire conduits for light, power, telephone, electric clocks, signal clocks, watchmen's time detectors, electric elevators, etc. The cost of the machinery, without counting the preparation of the foundations, was \$200,000, that is, \$50 for each horsepower. The power house itself under the University Hall, including tunnel and coal bunkers, cost \$350,000. The heat, light, and electric appliances for the buildings still to be erected will cost \$550,000. The whole power system, therefore, will cost about \$1,125,000.

The entire power plant was most carefully planned and executed in the highest style with regard to solidity and neatness. The subterranean rooms are excellently lighted and are models of cleanliness—the whole a work of art comparable to the power plant of an immense modern ocean passenger steamer. It should also serve as an object lesson for the technical department of the university. It is managed by 18 men, who work in three relays of eight hours each, and receive \$10,000 in wages. The annual expenditure for coal amounts to \$14,000.^a After all the buildings are completed the expenditures for coal will increase to \$27,500 and wages to \$15,000.^b

The library will some day form the center of the entire university—an excellent idea. It is situated at the top of a gently rising ground

^aThey are not allowed to burn soft coal in New York, a police regulation which would be very appropriate for Dresden.

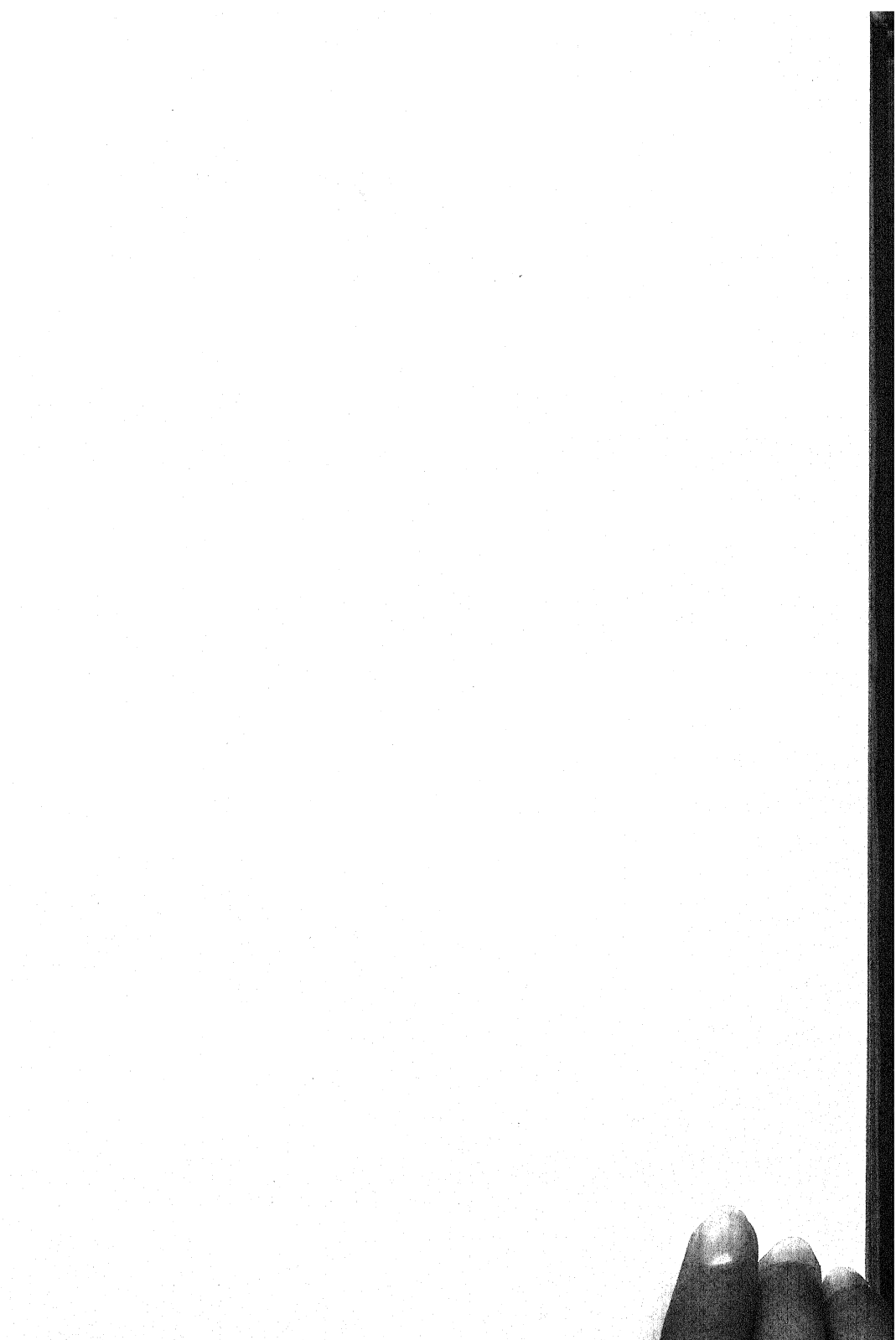
^bSee E. A. Darling, *The Power Plant of a University*, with 27 plates and figures. *Transactions of the American Society of Mechanical Engineers*, XX, 1899, pp. 663-724.

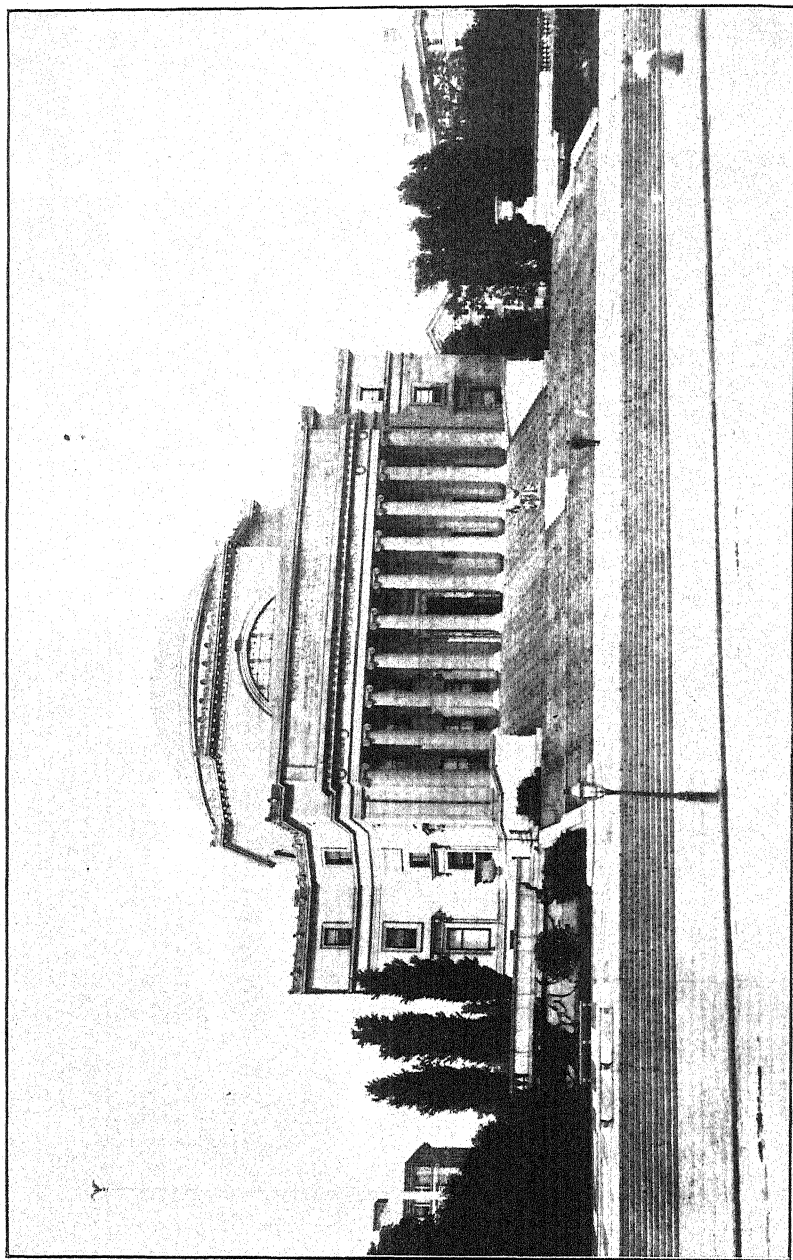
at the head of broad flights of steps. In Romanesque architecture according to the French conception, magnificent with its fine pillared portico and dome rising above the whole, it is worthy of comparison with the best modern buildings of European capitals. Three stories surround an imposing central hall, and the whole rests upon a raised ground floor 200 feet square. The center of the dome is 137 feet above the surface of the ground.

The library also accommodates those faculties whose equipment consists only of books and who, as yet, have no building of their own. Thus, the northern wing belongs almost exclusively to the law faculty. On the second story is the section of the library belonging to that faculty; on the third the reading room, with 140 seats; on the fourth an auditorium for 240 hearers; all three, like the raised ground floor, containing side rooms for administration, seminars, professors, and students; constituting, so to speak, a building for the law faculty within the university library.^a They are, however, already thinking of erecting a special law building.

The schools of political science and philosophy are in like manner accommodated in the western and eastern wings; only that here, instead of the reading room on the third floor, eight seminary rooms are to be divided into library sections which will serve for the corresponding schools; that is, for philosophy, pedagogics, literature, philology, political economy, public law, and history. Two such seminary rooms for Latin and Greek are located on the second floor. This is an ingenious arrangement, which, so far as I know, has nowhere else been carried out in this manner. A half story of the entire wing forms a single room, the inner three-fifths of which are occupied by 26 book-stacks, for the most part 20 feet long, while the outer two-fifths are empty. One can therefore look through from one end to the other, a distance of 110 feet. In the partition planes of the two-sided book-stacks of 12 by 12 feet run massive sliding doors of oak, reaching to the ceiling, of such dimensions as are perhaps seldom seen. These, however, may be easily handled, and by their means the outer open space may be divided into as many larger or smaller single rooms as may be desired, up to eight each. Every such room is provided with tables and chairs, so that one may sit secluded in the library of any particular branch. This arrangement seems to me as original as it is practical. The library is not so much a storehouse for books as a laboratory for study with books. Exactly as much care has been bestowed upon the reader as upon the books. On the fourth floor of each of these two wings there are four auditoriums, each accommodating 35 to 58 persons, as well as administrative and other side rooms. In the south wing, moreover, there are two auditoriums,

^aSee illustrations in the *Green Bag*, May, 1898, p. 199, and in *Columbia University Quarterly*, I, 1899, pp. 135 and 141.

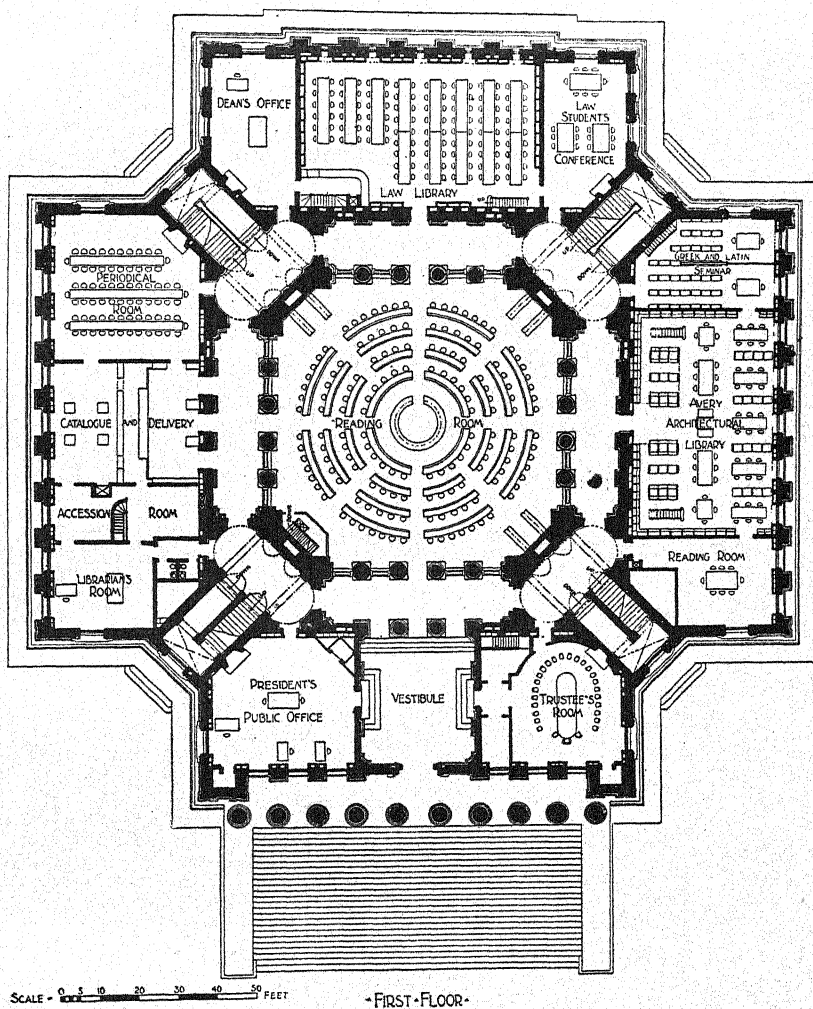




COLUMBIA UNIVERSITY, NEW YORK CITY.
Library building

each for 188 persons. From the upper floors a splendid view of the surrounding region may be enjoyed, as is also the case from the other university buildings.

The library has a total capacity for 1,500,000 books. It contains at present about 300,000, and about 30,000 pamphlets. The increase of



THE LIBRARY

FIG. 18.—Columbia University. Plan of first floor of library.

the last year amounted to more than 25,000. A special donation of \$15,000 was received for the purchase of books. It is estimated that the annual average increase will reach 18,000. The bookstacks are distributed in three stories, two stacks always standing one upon another; that is, arranged in each story independently of the others.

With the exception of the round wooden stacks in the rotunda and the old wooden ones in the basement they are of lacquered iron of dark green color, with similar movable veneered shelves (4-7) that may be easily adjusted, so perfectly finished that their surface feels like velvet. I am not acquainted with such excellent work of this kind in Europe.

The repositories have an intermediate space of $2\frac{1}{2}$ feet only, but may be brightly lighted by electricity. They were put up in the beginning without any intention of utilizing the daylight. On the ground floor there are special fireproof vaults for rare books, a provision which is lacking in most European libraries. In the central rotunda,

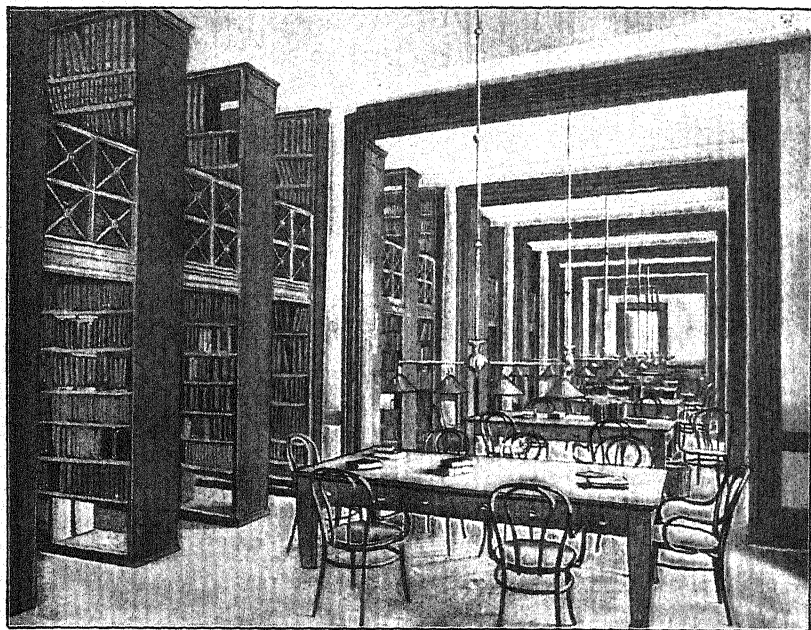


FIG. 19.—Columbia University. Seminar rooms on third floor of library.

the galleries of which are supported by 16 costly green granite pillars 29 feet high, with gilded Ionic capitals, there are 153 seats. In its entire design and in its artistic ornaments, although the decoration is not yet entirely finished, the rotunda constitutes a great attraction. The reference library comprises 10,000 volumes. The newly-acquired books are deposited for a time in this reference library. An alphabetical card catalogue,^a arranged systematically and very carefully

^aThe library is arranged and catalogued according to the Dewey system, completed by Cutter (Dewey was director of the library until 1888). Milkan (*Central-kataloge*, 1898, p. 20) writes, after Billings, that the Dewey system is now being replaced at the Columbia University library by another. This, however, is not the case. I was told that they were satisfied with the system and that they could get along very well with it.

prepared, is accessible to everybody. The reading room is open on week days (with only four exceptions during the year) from 8.30 o'clock in the morning till 11 o'clock at night; during the summer holidays (July to September) till 10 o'clock. The library is enviably easy of access. Up to a late hour in the evening everyone has unlimited freedom of reference in all rooms open to the public.

The order cards are forwarded by pneumatic tubes, the books return on small lifts driven by compressed air. In the evening the lofty reading room, in addition to the direct electric lighting, sufficient in itself, is brightened up by a so-called "moon," that is, a great globe suspended in the middle, on which electric light is thrown from the eight corners of the upper galleries and reflected from it. Beside the central hall is located a special library with its own reading room—the architectural library with 16,000 volumes. The valuable folios are kept in a horizontal position in separate iron repositories on copper rollers, and are thus very easily handled without injury to the binding. This arrangement is as perfect and as artistic as that of the above-mentioned bookstacks. I may note also among the special sections, a Goethe library of 1,200 volumes and a Kant library of 600 volumes.

The books are consulted chiefly by professors and students, who are permitted to take them away. Last year more than 77,000 volumes were thus taken out by about 3,000 persons. No record is kept of the attendance within the library, but all the seats in the reading rooms are usually occupied. Outsiders may consult books only in the library itself. Nine librarians and 22 assistants and cataloguers attend to the needs of the library, together with 29 copyists and messengers. Altogether 67 persons are employed, including 33 women.

The building itself is of fireproof construction throughout, but has wooden furniture (except most of the bookstacks) and wooden doors and window frames. The floors are stone, covered partly with parquetry and corticine, a very elastic kind of linoleum.

A wonderful spirit of care and order is everywhere apparent. Even in the anterooms the same elegant solidity prevails as in the sumptuous main rooms. Very few institutions of the kind could be compared with this one.

The cost of the library amounted to \$1,250,000, \$600,000 of which were for the interior furnishings. It was opened in 1897.

I must refrain from describing in detail the four following buildings with their institutes already completed, and must limit myself to short accounts:

1. The building for natural history and psychology (Schermerhorn Hall) is 215 feet long and 85 feet wide. The two basement floors, the first story, and half of the second story are devoted to mineralogy and geology; the other half of the second story to psychology, with labora-

tories after the Wundt pattern. Psychology is diligently fostered in the universities of the United States even more than in Germany, and Columbia University ranks among the first in this respect. Quite recently J. D. Rockefeller gave \$100,000 primarily for the better endowment of this chair. The third story contains seven other rooms for psychology, the remainder for botany. The fourth floor is devoted to zoology. Each of these sections has its museum for instruction, its reference library, its laboratories and lecture rooms (the large one for 250 persons), and the necessary anterooms. This was not carried out according to a fixed plan, but no pains have been spared to adapt every detail to its special objects and to work each out as completely as pos-

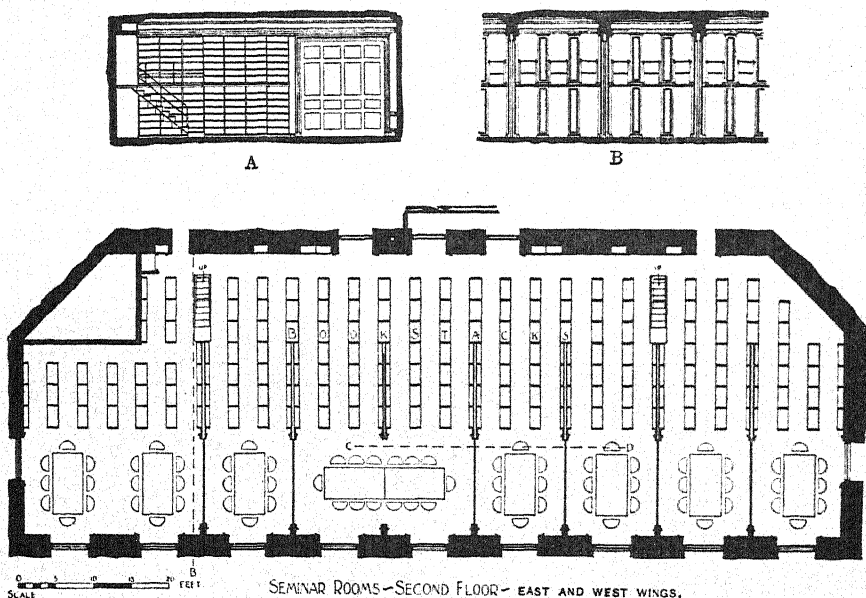


FIG. 20.—Columbia University. Plan of seminar rooms shown in figure 19. A, section through A B; B, section through C D.

sible. Toward this object advantage has been taken of the experience not only of America but also of Europe. The Prussian university plans at the Chicago World's Fair, the purchase of which was mentioned on a previous page, were of special value in this connection. The buildings, which are situated entirely on the plateau, have four stories above the ground floor; those erected on its edge have six on the outer side. The entire furnishings, including the cases containing the collections, the doors, and the window frames, are of wood; in other respects the construction is quite fireproof. The floors of the corridors, the laboratories, and the stairs are partly of marble, partly of other stones, marble mosaic, or asphalt; the floors of the lecture rooms, offices, etc., are of fireproof material, with parquetry of pine

or oak. In the reading and college rooms the parquetry is covered with corticine.

The above remarks apply also to the following three buildings:

2. The building for physics, astronomy, mechanics, English, and rhetoric (Fayerweather Hall) is 155 feet long and 60 feet wide. On the two basement floors, and on the first and second stories, physics is taught, the large lecture room having a capacity for 152; on the third floor is the section for English language and rhetoric with a lecture room for 140 students, and four rooms for 60 each, and the fourth is devoted to astronomy and mechanics, with one lecture room for 100, and three for 50 each.

3. The building for chemistry and architecture (Havemeyer Hall) is 215 feet long and 85 feet wide. On the two basement floors, metallurgy is taught; on the first to the third stories, chemistry (the lecture room for 325); on the fourth, architecture, with a large drawing room for about 150 students and a library, museum, lecture rooms, and special study rooms.

4. The technical building (engineering building) is 155 feet long and 60 feet wide, with museums, laboratories, workshops, lecture rooms, the largest for 146, drawing room, etc. The fourth story is almost entirely occupied by a large room for drawing, containing 78 tables. The workshops in the neighboring Teachers' College are also utilized by the students of the mechanical section.

These buildings cost between \$300,000 and \$600,000 each, altogether about \$1,750,000. Three of them bear the names of their founders. Eight similar ones are still to be erected; among them, one each for the law faculty, for philosophy and pedagogics, for history and political economy, and for philology. There will also be a college building, costing \$312,500. Between these structures, to the east and west of the library, a chapel will be built, for which quite recently an anonymous patron donated \$100,000, and a student's clubhouse, which is already in course of construction.^a Two older buildings, West Hall and College Hall, erected in 1878 and 1882, formerly used for different university and college purposes, than at present, will be torn down as soon as they can be replaced by buildings provided for in the plan. It would, therefore, not be worth while to describe them more minutely.

Finally, the gymnasium under University Hall is especially worth seeing, on account of its fitness and elegance. It has, perhaps, hardly an equal of its kind. Manly sport plays a still greater part in America than in England. The main room, which occupies two-thirds of the building in the rear, is of apse form and measures 35 feet in height, 168 feet in length, and 134 feet in width, with an area of 16,000 square feet, where athletic, gymnastic, and calisthenic exercises may be con-

^aThe chapel and clubhouse were completed in 1903.

ducted. An elliptical running track, constructed with extraordinary care, and which also extends through the front third of the building, is 11 feet broad and 555 feet long." Its ends are slanting with the outer edge 28 inches higher than the inner edge. In a mezzanine story are located rooms for fencing, boxing, and hand ball. There are 32 shower baths with marble walls, as well as 1,600 iron lockers. Half of the room under the gymnasium is occupied by a swimming tank in apse form, 100 feet long, 50 feet broad, and 4 to 10 feet deep, with a capacity for nearly 260,000 gallons. The water is constantly renewed, twice filtered, heated to 68° F., and then cooled. Electric currents radiate through it from the edge beneath the surface. Around the tank are placed four large dressing and rubbing rooms, 42 private dressing rooms of thick opaque glass, and 20 plunge baths, shower baths, and tub baths. In spite of its location below ground everything is brilliantly illuminated by light shafts from large windows. Each student pays \$7 a year for exercises, baths, and a locker. On entering, he is subjected to a rigid physical examination, receives advice and instructions according to the state of his health, and is afterwards directed in his exercises. The gymnasium is open from 10 a. m. to 7 p. m. One or more men in authority are always present. Instruction is given very systematically, and it is compulsory for the younger students, in order that everyone may have an opportunity to learn the elements of self-preservation and defense. With this object in view, chiefly boxing, fencing, wrestling, and swimming are practiced. To go further here into the details of the carefully considered methods of exercising would carry me too far. The gymnasium cost about \$500,000.

Upon the lower stories described, an additional story is now being built, which is to contain eating rooms, club rooms, and administrative rooms, as well as a hall, capable of accommodating 1,500 persons, for the religious and social life of the students.^b

Unquestionably Columbia University has a great future before it. It will pursue its victorious career in the foremost ranks of the champions for the dissemination of culture and the advancement of science, and it will the better perform its task if it keeps at its head men of lofty intellectual qualities, of eminent talent for organization, and of far-reaching personal influence. The presidents of the leading universities of the United States hold a prominent place in the public life of the great country; everybody knows them as everybody knows the ruling statesmen and politicians, and they are respectfully heard on questions affecting the public weal. Thus President Low, of Columbia, represented the Government at The Hague Peace Congress of 1899. The presidents exert a much greater influence over everything

^a See also *Columbia University Quarterly*, I, 1899, p. 295.

^b This building is now completed.—1903.

concerning the university^a than the changing rector of the German universities who is subordinate to a government department, and their power of initiative is quite different. That republican Americans love monarchical powers is shown by their railroad kings, their directors of great rings and trusts, and also by the authority of their Presidents, despotic for the time being. Seth Low,^b doctor of laws, was mayor of Brooklyn and an authority on the subject of municipal administration. In 1889 he was placed at the head of Columbia, and since then a new epoch has been inaugurated in the development of this university.^c He has not only placed his vast energy and his far-reaching influence at the service of the university, but he also sets an example by his self-sacrificing devotion. He erected the wonderful library of the university, that ornament and model of its kind, by a personal expenditure of \$1,250,000, and he ranks in other respects among the most active patrons of the great institution upon which he has left the impress of his mind.^d

THE PREDOMINANT INFLUENCE OF THE GERMAN OVER THE AMERICAN UNIVERSITIES.

Upon the predominating influence of the German universities over the American, and in consequence over the whole intellectual life of the Union, all voices appear to be unanimous. Thus, among others, David Starr Jordan, president of Leland Stanford Junior

^aThe difficulties of these positions are excellently described in an anonymous article in the *Atlantic Monthly* (April, 1900, pp. 483-493), on The Perplexities of a College President.

^bMr. Low retired in 1901 when he was elected mayor of the city of New York. Columbia then had 385 teachers, 4,500 students, 9 faculties, a library of 311,000 volumes, and its property amounted to \$18,000,000, of which Mr. Low had given \$1,500,000—1903.

^cThe author of an article "What is a University?" in the *Spectator*, London, February 12, 1898, p. 230, says, among other things: "Columbia is one of the best appointed institutions of learning in the world." A Riedler (*"Amerikanische technische Lehranstalten," Verhandlungen zur Beförderung des Gewerbebeleses*, 1893, p. 422) expressed the opinion seven years ago that Columbia would probably become the foremost institution of learning in the United States. Columbia University and Teachers College were each awarded a gold medal at the Paris Exposition of the year 1900, the former for photographs, publications, and psychology, the latter as a higher normal school.

^dIt might interest German readers to know that Columbia University in 1889 bestowed the degree of doctor of laws upon Carl Schurz. The promoter said, among other things, on that occasion: "We must congratulate ourselves that in honoring him, we help to strengthen the bond which unites Germany and America; that we, in honoring him, also honor the great land which is his parent country and the original home of all those in whose veins flows English blood."

At the same time a Carl Schurz donation to the amount of \$20,000 was given to the university by his friends on condition that the interest on one-half the amount should be applied to establishing a fellowship in German and the other half be devoted to purchases for the Germanic section of the library. A knowledge of German is now one of the requirements for admission to Columbia University, and in most of the universities the degree of doctor is bestowed only upon the candidate who is able to read printed German fluently and to translate it into English at sight.

University of California, in an article on "The urgent Need of a National University in Washington,"^a observes:

The great revival of learning in the United States, which has shown itself in the growth of universities, in the rise of the spirit of investigation, and in the realization of the value of truth, can be traced in a large degree to Germanic influences. These influences have not come to us through German immigration, or through the presence of German scholars among us, but through the experience of American scholars in Germany. If it be true, as Mr. James Bryce says [*American Commonwealth*, II, 1889, p. 694, 3 ed.], that "of all institutions in America," the universities, "have the best promise for the future," we have Germany to thank for this. It is, however, no abstract Germany that we may thank, but a concrete fact. It is the existence in Germany of universities, strong, effective, and free.

Even English voices lay stress upon this fact. Thus, in an article in the *Spectator* of February 12, 1898, on "What is a University?" in which, in consideration of the establishment of a university in London, five types of modern universities are characterized, the French, German, English, Scotch, and American (p. 231), it says concerning the American types:

We come now to the American universities, by which we mean the greater institutions of culture, not the hundreds of petty colleges to be found in all parts of America. Some of these, in our judgment, come nearer to the ideal of a true university than any of the other types. Beginning on the old English collegiate system, they have broadened out into vast and splendidly endowed institutions of universal learning, have assimilated some German features, and have combined successfully college routine and discipline with mature and advanced work. Harvard and Princeton were originally English colleges; now, without entirely abandoning the college system, they are great semi-German seats of learning. Johns Hopkins at Baltimore is purely of the German type with no residence, and only a few plain lecture rooms, library, and museums. Columbia, originally an old English college, is now perhaps the first university in America, magnificently endowed, with stately buildings, and with a school of political and legal science second only to that of Paris. * * * The quadrangles and lawns of Harvard, Yale, and Princeton almost recall Oxford and Cambridge; their lecture rooms, laboratories, and postgraduate studies hint of Germany, where nearly all American teachers of the present generation have been educated.

I myself received the impression that the majority of the professors of the universities which I visited in New York, Chicago, Philadelphia, Boston, and Cambridge, with whom I became acquainted—and there were not a few of them—had studied in Germany or had at least spent some time there, of course excepting the few Germans who filled positions in the universities named.

When, in January of this year, the faculty and students of the University of Chicago gave a formal reception in Chicago to the German ambassador, the professor of political economy, Mr. Laughlin, delivered the address of welcome, from which I take the following sentences (*Illinois Staats-Zeitung*, January 25, 1900, p. 5):

There is no American university which is not imbued with the fire of German intellectual activity. We have attended in crowds the lecture halls of the universi-

^a *Forum*, January, 1897, p. 600.

ties and lighted the lamp of our knowledge at their altars. The Americans have found the love of truth, the sacred yearning after knowledge and poetry in Heidelberg, Göttingen, Tübingen, etc. When we look down upon the red roofs and towers of Göttingen, as upon the red marvel-flower of wisdom as it lies there surrounded by a garland of lindens standing on the old walls, we find there not only the student quarters of Bismarck but also the places where Bancroft and Longfellow intrenched themselves behind their books. To be sure the German universities have not served as models for our own, but we have adapted the spirit of their knowledge to our circumstances. * * * Our debt to German science is great; we can not repay it.

I heard these very words, that the debt of gratitude could never be repaid to Germany, from the mouth of one of the professors of the Technical High School in Boston, when, upon my thanking him for the very obliging reception which I had met with, he refused to accept my thanks.

(In the library of Edison's private laboratory at Orange, near New York, I found, as artistic ornaments, the bust of Alexander von Humboldt and the portraits of Bunsen, Helmholtz, Kirchhoff, Kopp, Liebig, and Magnus, but of no other scientists. When I told Edison how pleased I was to see that he surrounded himself with the portraits of German scientists, he told me of his friendship with Helmholtz and Siemens, and mentioned that he had that very morning to consult a treatise by Wöhler.)

The present ambassador of the United States to the German Empire, A. D. White, at a banquet given in July of this year to the American Mechanical and Civil Engineering Association in Berlin, expressed himself in the following terms: He looked back with great satisfaction to the time, thirty years before, when he had studied the conditions of the high schools and the technical schools in Berlin, he had been able, on his return to America, to point to these institutions as worthy of imitation. As a consequence Cornell University, of which, for a quarter of a century, he was the first president, and other special and technical schools were founded. Many of his countrymen had received in Germany the impulse and the knowledge for the establishment of institutions of learning in their own land. He had returned to America with love and reverence for his teachers. He, with many of his countrymen, regarded Germany as his second fatherland.

L. Triang said, in a lecture on "Germany in the American universities," recently delivered before the German Society of Columbia University (*Zeitgeist*, March 5, 1900):

The student who, after completion of the studies usual in his country, wishes to perfect himself in his profession and carry on special studies, almost invariably goes to Germany, where a great proportion of the entire body of American teachers have received their final education and imbibed the German spirit of learning and the German scientific faithfulness.

Prof. Harry Thurston Peck, of Columbia University, and, as editor of the *Bookman*, one of our most prominent critics [I quote from an article by M. Groszmann in *The Open Court* (Chicago), October, 1899, p. 620], showed in a recent article that the old traditions of American education have been wiped out by German influence;

that a vivid interest in German pedagogy is asserting itself more and more, and that German language and literature are crowding out other foreign influences. He went so far as to say, "German influence has already altered the racial character of our people."

In Volume II of the report of the Commissioner of Education for the year 1897-98 (Washington, 1899), in the chapter entitled *Foreigners in Universities of Europe*," page 1702, and in other places of this great work, may be found the following statements: American students preferably attend Jena, Leipzig, Heidelberg, and Berlin, owing to the courses at these universities. In 1895, 3,362 foreigners were matriculated at German universities, of whom 514 were Americans, but it is estimated that at least an equal number studied by attending lectures, so that altogether an annual quota of over 1,000 Americans may be estimated. At the same time only 108 Americans were matriculated in Austrian institutions and 65 in Swiss institutions. In 1895 Berlin had 159 Americans out of 4,018 students, Leipzig 53 out of 2,798, Göttingen 30 out of 578; Paris, on the other hand, had only 32 out of 10,915.^a

James Bryce (*American Commonwealth*, 3d ed., II, 1899, p. 682) says, giving reasons therefore, that "extremely few" of the American students go to Oxford or Cambridge in England. With reference to France, it is stated in an article by F. C. Newcombe, "Opportunities for biological study in Paris and the requirements for the new doctorate," in *Science* (May 11, 1900, p. 740):

Why do these men in American universities advise their students to go to Germany? Why are the scientific libraries in this country so much better stocked with German literature than with French literature? I can not help feeling, though I have no statistics, that on the whole Germany has, within the past forty years, produced more scientific men and more scientific literature than has France. It is doubtless true that we neglect unduly French scientific literature in this country, but it is probably also true that to-day, as forty years ago, we justly look to Germany as the seat of the leading spirits in the progress of biological science.

E. D. Perry, professor of Greek in Columbia University, says:^b

"It is the glory of Germany that she has seen more clearly than other nations how true it is that the highest scientific training is none too good for her public servants." Compare his very plain statement concerning the influence of the German university on the development of American universities, pages 288 and 289. Although S. Sherwood (University of the State of New York, *Regents' Bulletin* No. 11, Albany, 1893, p. 269) ascribes to the "revolutionary France" the greater influence in shaping the character of the entire modern system of education of Europe and America, nevertheless he freely admits that the German systems are now "models for the world."

In a very interesting manner H. A. Hinsdale, professor of peda-

^aThe bad influence of Paris on the students has been described in *Nation*, p. 149 August 23, 1900.

^bEducation in the United States, edited by N. M. Butler, I, 1900, p. 306.

gogics in the University of Michigan, also describes this same influence in the chapter Notes on the History of foreign Influence upon Education in the United States of the above-cited education report (I, p. 603-629). Among other things he there gives a list of the Americans who studied in Göttingen from 1789 to 1851, in Halle from 1826 to 1849, in Berlin from 1825 to 1850, and in Leipsic from 1827 to 1840. Supplementary to this, Professor Perry, who has already been quoted, remarks^a that after 1848 a noticeable number of Americans, including many of the most eminent scholars the country has produced, obtained degrees in Germany, and that after 1870, hundreds visited Germany annually, which, together with the opening of the Johns Hopkins University in Baltimore in January, 1876, on an avowedly German plan, gave a mighty impulse.

In the same periodical (p. 6) H. A. Todd, professor of romantic philology in Columbia University, states that prior to the last twenty years American students abroad attended almost exclusively German universities. To-day, therefore, the American universities are manned pre-eminently by professors who have been in close contact with the leading minds of Germany. Although it is now customary to advise American students to study for a year in Germany, Professor Todd can, "with prophetic eye, foresee the time when it will become of interest to an increasing number of European students to seek part of their training in the United States." I think time will show that he is right. That so large a percentage of the active professors of the American universities have studied in Germany may perhaps be in part explained by the fact that the men who sought to complete their education in Europe were a very select intellectual band. Only the best fitted and the most ambitious young scientists felt the desire to extend their circle of vision. Their knowledge and their views were essentially widened in Europe, and thus they returned predestined to fill positions as teachers.

Prof. H. Münsterberg, of Harvard, has recently expressed the opinion^b that, although the spirit of American universities has for the past fifty years been determined by men who have studied in Germany and brought home with them enthusiasm for German science, these relations are now changing. The number of students, he says, who after a couple of years of study return from Germany deeply disappointed, is increasing in a striking manner, and everywhere the advice is heard to finish one's ordinary studies in America and to seek further inspiration in Germany only after having obtained a degree. Such a change would show that the former conditions of dependence no longer exist to their former extent, and that the time when Professor Todd's prophecy will come true is already approaching.

^a *Columbia University Quarterly*, II, 1899, p. 3.

^b *Zukunft*, 1900, No. 35, p. 392.

6. IRON FURNITURE, GLASS CASES, FIREPROOF BUILDINGS, LIGHTING OF INTERIOR OF BUILDINGS, DISTANT HEATING.

IRON FURNITURE.

The Art Metal Construction Company of Jamestown, New York, formerly the Fenton Metallic Manufacturing Company, which has its office (and samples) in the magnificent building of the New York



FIG. 21.—Fire-proof policy room of the New York Life Insurance Company.

Life Insurance Company, 346 Broadway, manufactures, among other things, iron cases for documents and records of every description, library stacks and furniture, such as desks, tables, chairs, cases, etc. In the building mentioned it has fitted up several of its offices entirely

fireproof with iron furnishings to the value of \$50,000. I give two illustrations of the policy room and its ground plan, as well as an illustration of its iron correspondence case with iron, double-roller shutters. This firm also manufactured the previously mentioned handsome book

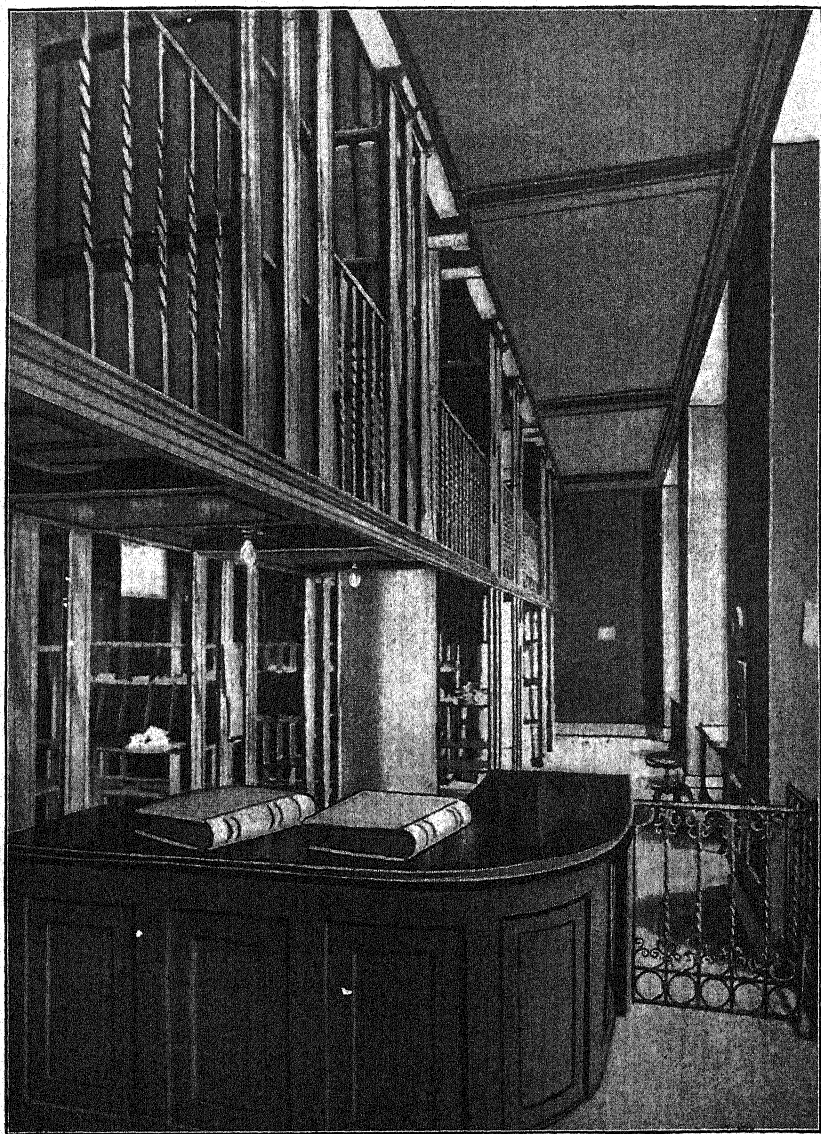


FIG. 22.—Another portion of the room shown in fig. 21.

stacks of Columbia University. Its contrivances are widely distributed over the entire great country. Among other things worth seeing in New York is also the fireproof real estate record room of the New York Central and Hudson River Railroad Company, installed by this

firm, where everything is of iron. It has done some very excellent work in several Government buildings in Massachusetts, about which I shall speak under Boston. The authorities of the United States, for

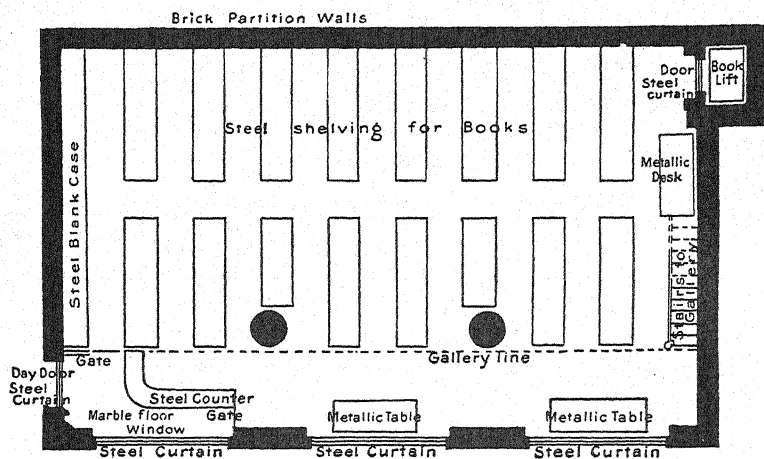


FIG. 23.—Ground plan of the room shown in figs. 21, 22.

the sake of greater security against fire, are turning more and more to iron furniture, which is preferable to wood also on account of its general appearance. Iron is prepared for this purpose with much better machinery than among us, and is, in consequence, in spite of higher wages, much cheaper than in Germany. It has at the same time the advantage of an elegant exterior. Especially perfect is the varnish, which is obtained by triple burning. By its use the iron becomes as if enameled. It is, moreover, adorned with bronze, brass, marble, painting, and the like.

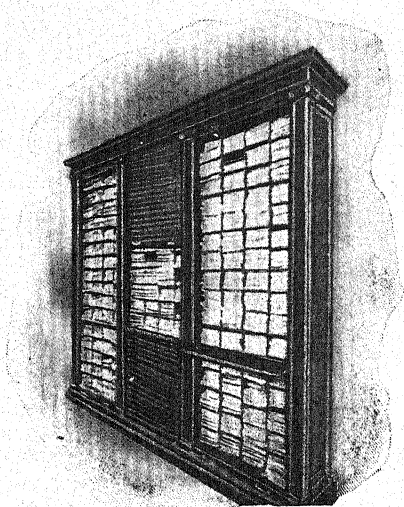


FIG. 24.—Document case, with double-roller curtain. (See p. 381.)

There are several larger firms of the same sort in the United States, as, for example, Snead & Co. Iron Works in Louisville, Kentucky, which, among other things, constructed the remarkable iron book stacks in the Library of Congress, to which I shall refer in a later report; there is also J. B. and J. M. Cornell, Twenty-sixth street and Eleventh avenue in New York (also Cold Spring in New York), who manufactured the furnishings of the county court-house in Worces-

ter, Massachusetts, and at whose establishment I saw document cases and record cases in course of construction for the court-house in Baltimore, parts of an order for \$60,000. The iron book stacks of this firm pleased me particularly on account of their simplicity, as compared with the different models which I saw in the libraries of New York, Albany, Buffalo, Chicago, Washington, Philadelphia, Boston, and Cambridge. The figured case for folio volumes which rest upon rollers can be closed by iron roller shutters.

With regard to fireproof rooms and their fitting up with iron furniture, we in Europe are, at all events, far behind America, and I can not too strongly recommend adopting in our museums and other public buildings such contrivances which are already in very general use

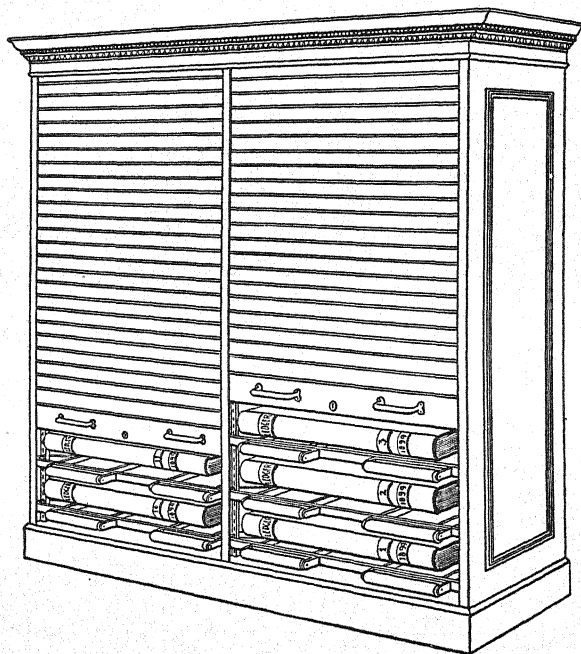


FIG. 25.—Case for folio volumes, with roller curtain and books on rollers (See p. 382).

there. One of the above-mentioned firms has the motto, "Anything in metal from a building to a box." It is the more surprising that the American museums have as yet no iron, but only wooden cases and desks for their collections,^a whereas the former are already used to some extent in Europe. There can be no doubt that the Americans, when once they shall have decided on iron furniture for museums, will be in a position to construct it in a much more perfect manner than we have as yet succeeded in doing in Europe, since their experiences with other iron contrivances have already carried them very far.

^a They have since begun to fit with such the Wistar Institute in Philadelphia, and, I believe, other places.

It is difficult to induce the firms mentioned to execute small orders for Europe. I have so far only succeeded in obtaining for the Dresden Museum from Snead & Co. a free standing iron book stack, and from the Art Metal Company an iron card catalogue case with twelve drawers.

GLASS CASES.

At the establishment of F. Pollard (33-37 Bethune street, New York City; also Cleveland, Ohio, and Pittsburg, Pennsylvania) I saw glass cases and glass desks without framework except on the back, and of excellent workmanship. My attention was first attracted to very large show windows of this kind whose plate glass panes were not fastened in iron or wooden frames, but were held by metal screws which pressed the edges of the glass together, with only a thin layer of cloth

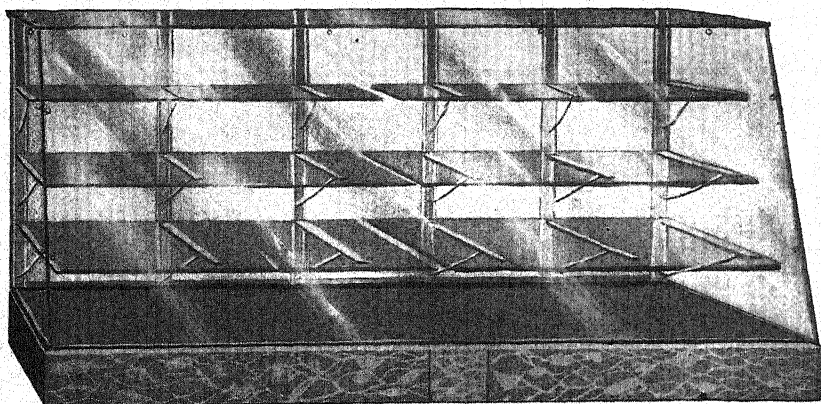
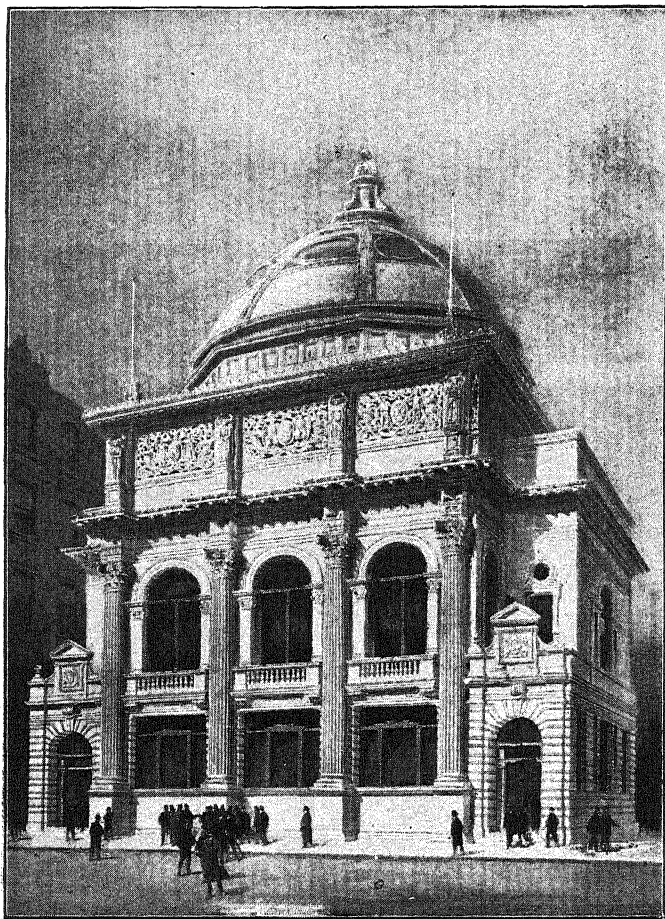


FIG. 26.—Long, low case, or desk top, with marble base. Opening behind.

between to make them fit tightly. These cases are, so far as I am aware, as yet nowhere used in museums. They now serve only for show cases in business houses, but are excellently adapted for public collections on account of their elegance and absence of framework on the show sides. Cases completely proof against dust, which have not as yet been manufactured, could easily be attained. They are opened and closed at the back by means of glass doors in wooden or white metal frames; socle or base of marble or of any other material. I give a figure of a case of the kind which, with lower socle, could be used as a desk top, and which may be had up to five meters in length. I obtained a sample of such a case of smaller size for the Dresden Museum. At the Industrial Exposition in Philadelphia I saw similar very elegant glass cases manufactured by the firm of F. X. Ganter, Leadenhall and Stockholm streets, Baltimore, with branch houses in Boston, New York, Philadelphia, and Washington. These cases were made tight by means of silk bands. The business is now turned into a joint stock company, the Crystal Show Case and Mirror Company, which is to go over "the whole earth."



NEW YORK CLEARING HOUSE, NEW YORK CITY.



UNIVERSITY CLUB HOUSE, NEW YORK CITY.

FIREPROOF BUILDINGS.

In New York very many fireproof and burglar-proof buildings may be found. I inspected among others the magnificent building erected by Gibson in 1896 for the New York Clearing House Association (Cedar street), whose balances amount annually to \$35,000,000,000^a and where millions in gold are constantly stored. Everything is done here to guard against robbery, fire, and insurrection. The different rooms are separated from one another by grates and doors; the iron cases for valuables are so constructed that they may be instantly closed by a grasp of the hand; the cash vaults may be submerged, and the whole may be turned into a kind of fortress with cannon and muskets. Electric bells to summon aid from without are to be found everywhere. The vaults could be reached by dynamite only in case one were willing to bury himself under the ruins, since undermining it from without is practically impossible on account of the deep foundation. Elsewhere iron armor plates have been employed as a protection against cannon balls. It does not appear from without that the clearing house is so formidably protected. Such contrivances would, indeed, not be applicable to museums, but some of them might be introduced to protect certain objects of value or sections of the museums.^b

I take at random among others, as an object well worth seeing, the recently completed fireproof building of the University Club (Fifth avenue and Fifty-fourth street), five stories in front and eight stories in the rear, constructed by McKim, Mead & White. It is a Florentine fortress-palace, 125 feet in height, ornamented among other things with the arms of eighteen American universities in stone. The club has 3,000 members, all of whom must possess a learned degree in order to be admitted, and contains a library of 20,000 volumes. A higher standard of solidity, fitness, and carefully planned, practical utilization and distribution of space, with taste and elegance in execution, could scarcely be imagined. The flat roof, which affords a fine view, serves in summer evenings as a pleasant resort. In the cellar there is a gymnasium. All mechanical contrivances are of a high degree of perfection, embodying all possible modern inventions, and many of them would be applicable to buildings for collections. The whole is a model and unique structure of its kind and comparable only to a prince's palace. The cost of the ground, building, and furnishings amounted to over \$2,125,000.

^a The average daily balances in 1901 were \$254,193,638; on May 10, \$598,537,409. The average daily balance in gold and bank notes was \$11,600,784.

^b In the basement of the Swiss Landes Museum at Zürich there is a fireproof and burglar-proof room, lighted only by electricity and handsomely installed, for all the precious things of the collection and where they are exhibited to the public in iron desks.

With regard to the fireproofing the following may be specially noted: The outer walls are of brick and granite; all the inner partitions of hollow terra-cotta blocks. The ceilings are supported by wrought-iron columns, which are covered over with hollow terra-cotta blocks. The joists are of steel, and the dome ceiling is constructed in even arches of hollow terra-cotta blocks. The space between these blocks and the joists is filled with concrete. In this concrete are placed the beams, to which the flooring is nailed. This and similar ceiling construction is indeed known and used among us, but is not in such general use as in America.

For protection against fire, two 4-inch pipes run from the roof to the cellar, where they are connected with a steam pump, and continue out to the street, so that the hose belonging to the city fire department may be attached to them. In each story there is a branch pipe with hose coupling, hose, and mouthpiece. The hose is wound around a wheel. The roof is flat and completely covered with glazed bricks.

In the roofing of fireproof buildings special attention should be paid to protection against flying cinders, which may extend much farther than is generally supposed. Some years ago a fire broke out in a private residence on Fifth avenue between Sixty-seventh and Sixty-

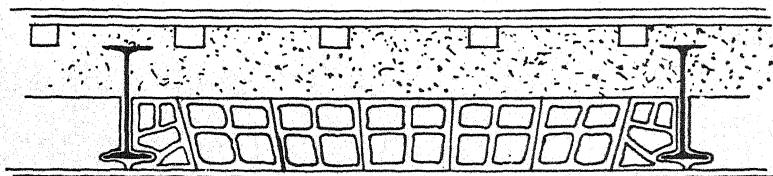


FIG. 27.—Ceiling and floor construction.

eighth streets, opposite Central Park, in the best part of the city, by which thirteen persons lost their lives. The sparks flew over two cross streets and ignited the roof of another private residence, resulting in the loss of two additional lives, and yet the houses in this locality all look like solid stone structures. The distance was from 600 to 650 feet. This shows the danger of leaving buildings containing collections in the middle of the city, as some of them are located in Dresden, without very carefully planned protection against fire, especially in the upper portions. Fire has often been known to cross a street more than 65 feet wide.

In describing the institutions of Chicago I shall return to the subject of fireproof buildings and questions connected with them.

The heating and ventilating apparatus in the model building of the University Club may also be described somewhat more in detail:

The exhaust steam of the electric light and power plant suffices for heating the entire building with low-pressure steam. Every radiator has its own supply pipes and return pipes, and the main return pipes run into the cellar below the water level of the boiler, in order to afford

safer and noiseless circulation. The condensed steam is forced back to the boilers by self-regulating steam pumps.

The temperature in the main rooms is automatically regulated by Johnson thermostats. This apparatus was invented by Professor Johnson, of Milwaukee, and perfected to its present successful application. The Johnson Temperature Regulating Company, Fourth avenue, New York, has already set up such apparatus in hundreds of buildings. The most essential portions of the apparatus consist of diaphragms and cut-off valves to control the source of heat, moved by compressed air, and thermostats, which regulate the flow of compressed air to the valves by the movement of a compound band. This band is to be adjusted so that the desired range in the temperature may thereby be attained. The ventilating system is independent of the heating, so that it may be set in motion according to the need of the different times of day. The fresh air is warmed a little so that it does not disturb the equilibrium of temperature in the rooms. This warming is also regulated by thermostats. The system of ventilation insures a thorough circulation, but at the same time prevents a draft. All the main rooms are sufficiently provided with fresh air, which is changed on an average six times an hour. The exhaust air is drawn off according to the need. The cloak rooms, toilet rooms, etc., the kitchen, which is fitted up in a specially ingenious manner, and the laundry have exhausters only. The air is here renewed from ten to fifteen times an hour.

The fans which supply the air are centrifugal blowers, which are driven by direct-acting, high-pressure engines. These fans, the engines, and the heaters occupy a special room in the cellar. The exhausters on the roof are discoidal ventilators, which are driven by direct-acting electromotors.

LIGHTING OF INTERIORS.

I saw for the first time in the Boston Art Museum a lighting of rooms by windows with prismatically-ribbed panes, which made it possible to illuminate otherwise somewhat dark wall surfaces in such a manner by daylight that they were thereby adapted to the hanging of pictures. When once my attention was attracted to this matter I found such prismatic panes in use in many other places. I hunted up the business office of the American Luxfer Prism Company, 160 Fifth avenue, New York, a company which originally had its headquarters in Chicago, but which now has its central office in London under the name General Luxfer Prism Company, with branches in Chicago, Toronto, London, Paris, and Berlin. In the United States the American Luxfer Prism Company has its offices in seventeen other cities—an extensive industry whose products are widely distributed.

It is the more astonishing that museums have not yet directed their attention to this matter, for nowhere did I find this glass in use except

in the Boston museum mentioned, unless it escaped my notice, while scarcely a building for collections exists which is not capable of improvement in this respect. The company makes 60 different kinds of prismatic panes and single prisms, the latter for skylights, which in the United States are used very much in rooms under the pavements of the streets, since these rooms belong to the cellars of the adjacent houses. The ribbed panes, of the uniform size of 10 square centimeters, are electrolytically glazed between flat copper bands,^a and are then fireproof, which offers another great advantage and permits their employment as window shutters, doors, etc., for closing entire stories, and the like.

A similar company is the Mississippi Glass Company, with agencies in Boston (Boston Plate and Window Glass Company). Prof. C. H. Norton, of the Massachusetts Institute of Technology, made a report on this subject in 1898, based upon experiments (The Diffusion of

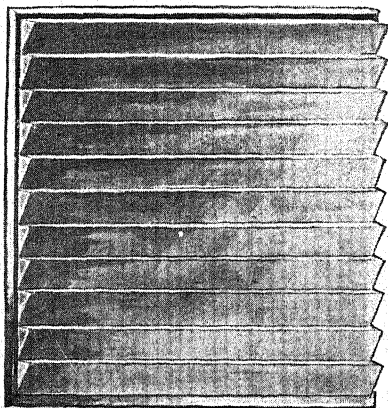


FIG. 28.—Prismatic, ribbed-glass unit of the American Luxfer Prism Company.

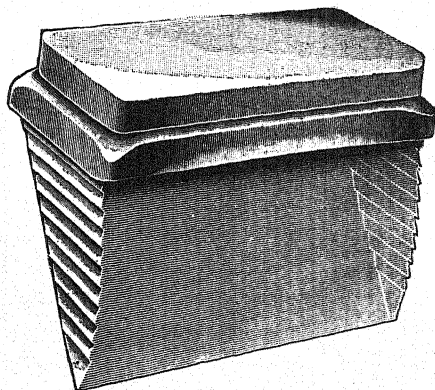


FIG. 29.—Single prism, as made by the American Luxfer Prism Company.

Light through Windows, in the seventy-second circular of the Boston Manufacturers' Mutual Fire Insurance Company, by E. Atkinson, 13 pages in quarto).^b O. H. Basquin published in 1899 for the German Luxfer Prism Syndicate in Berlin a Handbook on Luxfer Prisms and Electro-glass (82 pages, quarto, with 21 plates and about 100 text figures), which offers an explanation of this subject, which is so important for lighting and such a security against fire.^c I give a

^a There are now (1903) manufactured large panes of prismatically ribbed glass without these copper bands between, which, though not as powerful as those small ones, give very good results (as I experienced in the Dresden Museum), and which are much cheaper.

^b This appeared in 1902 in third enlarged edition, in Report III of the Insurance Engineer Experiment Station, 31 Milk street, Boston, pages 10-33, with many illustrations, quarto.

^c Dr. B. Wandolleck, assistant in the Dresden Zoological Museum, was kind enough to prepare the following statement concerning luxfer prisms and electro-glass, based on the two papers cited in the text as well as on his own studies. I insert it here

figure of a prismatic ribbed glass plate and a single prism. The latter may be had up to a considerable size. The flat form (multi-prism plate) costs \$30 to \$40 a square yard; and the ribbed glass plates in their copper frames, \$20 a square yard. I have made a trial of a window with about 5 square yards of plate glass in the ethnographic department of the Dresden Museum.

because I consider the subject important for museums so long as they have not learned to build them with all rooms equally well lighted:

Everybody has perhaps noticed that rooms on the ground floor, under most circumstances poorly lighted, in winter, when the window panes are thickly covered with frost, have an agreeable, uniform light. They have perhaps also noticed that at other times, when the panes are clear and dry, only a small space near the window is really well lighted and the other parts of the room remain more or less in shadow. In the case of the frost a peculiar diffusion of the light is noticeable, the sharp contrast between the part near the window and the inner part has disappeared, and only very gradually does the intensity of the light diminish toward the back part of the room.

For lighting a room by daylight by means of its windows, the bit of open sky which looks in through the windows is more important than anything else. The

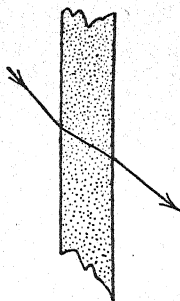


FIG. 30.

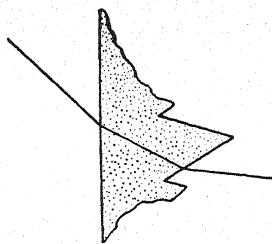


FIG. 31.

amount of light derived by reflection from other objects is, on the other hand, very small. The nearer opposite buildings are to the windows of a room or the higher those buildings are, the smaller will be the bit of sky which can look into the room and light it up. Why, then, under the same conditions of light, does such a room appear brighter—that is, more uniformly lighted—when the windows are frosty than when they are clear?

The window is struck by a bunch of rays which goes through the plane parallel glass without changing their direction (fig. 30), and the more obliquely they fall the smaller will be the surface of floor which they strike and illuminate. The light which illuminates the rest of the room is derived by reflection from this small spot.

The particles of frost on the windows consist of crystallized water, of an immense number of small hexagonal prisms. Every ray of light which strikes one of these small prisms is refracted and takes another direction. Since the numberless prisms lie in every conceivable direction on the surface of the glass, the rays of light striking them are also turned in every possible direction. They will not fall parallel on the floor as before, but shoot into the room in every direction. The room is no longer filled with the scanty reflected light which comes from the lighted spot on the floor, but with light direct from the sky (fig. 31).

This observation has led to a discovery which is of the greatest importance in lighting dark rooms by daylight. The problem to solve was merely to replace the

DISTANT HEATING.

The distances which in Dresden are taken into consideration in the establishment of the distant-heating plant for the museums, etc., hold a middle place between American district-heating systems and distant-heating establishments, but incline more toward the former.

The New York Steam Company has established a great district steam heating system with several boiler houses in the lower part of the city almost from the Battery to the other side of the city hall, 1,500 yards up Broadway, extending about half that distance east and west in the side streets; altogether about 8 miles of pipe. Among other great buildings included in this system are the post-office, Mills Building with ten stories, and Manhattan Life Building with its 350-foot tower. The amount of steam furnished (including power) is said to be satisfactory, but the returns are not considerable. Such district heating establishments are to be found in Lockport, Detroit, Philadelphia, Washington, Hartford, etc., but all except one are out of use, as they did not prove a success. On the other hand, district heating systems have lately been combined with electric plants by utilizing the exhaust steam, as in Springfield, Illinois, and in other cities. For the financial success close proximity of the heated district

ice prisms of the frozen windows by glass prisms and to give the glass prisms a regular arrangement in place of the irregularity of the ice crystals. Another part of the problem to solve was to regulate the direction of the rays falling in at random. Everything was already fully accomplished by the Fresnel lenses in the light-houses. It was therefore only necessary to remodel this costly contrivance so as to adapt it to other uses and to cheapen it enough to bring it within reach of the general public. This the Luxfer Prism Company succeeded in doing. It manufactures out of plain, colorless, hard-glass mold small, strong window panes, with one surface plain, but the other fluted with deep parallel grooves. By means of these furrows they obtain strong strips of glass, to which are given the form of distinct-angled, three-sided prisms. The prisms have a common basal surface, parallel to the plane surface of the plane, and their corresponding surfaces are likewise parallel. (See fig. 28.)

If rays of light fall upon the plane, they are not conveyed on in the same direction, as in the case of ordinary window glass, but are refracted to an angle bearing a definite relation to the angle of the prisms. (Fig. 31.)

If we take a window consisting of nothing but prism panes, all of whose prisms lie parallel, all rays of light will strike into the room in a parallel direction. It is easy to understand that by a different arrangement of the prism panes or certain portions of them, rays can be conducted into any desired parts of the room.

But all poorly lighted rooms do not have such spacious windows as supposed in the above description. A very large number of rooms lie below the level of the street. Their small windows and the poor light of the generally large rooms limit their use to a great extent. These windows, which are placed in a narrow shaft and often scarcely rise above the level of the street, excludes the use of those prism panes because the amount of light coming in from the sky is entirely too narrow. This difficulty has been obviated by the construction of a particular kind of prism.

The mass of light would become greater if the light shaft could be made larger, but traffic on the street forbids that.

It therefore became necessary to find some contrivance which would make it possible to enlarge the light shaft without interfering with the street traffic. The light shaft is covered by a plate consisting of prisms. This plate is composed of very

to the power station and also a certain size of the district is requisite. In St. Joseph, Missouri, a block of business houses, with a room space of over 300,000 cubic yards, is heated by the exhaust steam from the electric station situated a mile away.

On the other hand, it has been discovered that the special heating apparatus is more advantageous for very large buildings and single groups of buildings, although the expenditure of coal is not thereby diminished. Of such, there are very many in America. Most large buildings have their own power plants for electric lighting, electric and hydraulic power for elevators, ventilators, etc., and for the manufacture of ice and the like, in which the working engines afford steam for heating almost without cost. Chimneys project but little above the roofs and never give forth such smoke as among us, especially as in Dresden. In America better coal is burned. Relatively few high chimneys are seen in the cities and they do not attract so much attention on account of the height of the buildings. I have already mentioned the distance-heating of Columbia University. The Grand Hotel on Broadway possesses a plant for electric lighting for four blocks of houses," and the exhaust steam from the engines suffices to

large single prisms (see fig. 29, p. 388), which receive light direct from the sky on their entire basal surface. They then throw this maximum mass at a fixed angle against the perpendicular or oblique, stationary or movable windows of the room, whence prism panes, instead of the usual window glass, distribute the rays.

In order that the ideas which we have just traced, and which rest upon physical principles, might be put into practice with a result approaching as near as possible to the theory, one more invention was requisite, namely, that of galvanic glazing.

Whereas formerly, and still almost universally, the panes are fastened to the framework of windows by means of putty or strips of lead, galvanic glazing employs electrolytically precipitated, and therefore to a certain extent plastic, copper as a cement. The single panes, with a framework of thin copper strips, are tied to plates of fixed size, and thus placed in the copper bath. In about thirty hours electrolytic copper is precipitated upon the copper strips and this binds the panes to their frames firmly and immovably, making them absolutely air proof.

The advantage of this electrolytic glazing is great. In the first place, the strips separating the panes can be made considerably narrower, which is equivalent to a smaller loss of light; and then such windows are more elastic and much more capable of resistance than puttied windows, and show themselves to be fireproof to an eminent degree.

While windows glazed in the usual manner immediately burst and fall out on being heated, these windows have shown their absolute stability during very many trials. If, while heated, they are struck by a stream of water from the hose, they burst, to be sure, but never fall out. Electro-glazing is therefore to be used especially in elevator and light shafts, since the latter, with their glazing so little capable of resistance, are not only incapable of opposing the devouring element in the different stories, but generally open the way to it.

"In New York among most of the straight long and cross streets a block east of Fifth avenue is in general from 400 to 420 feet long and 200 feet wide; the long streets from 75 to 140 feet wide, and the cross streets 60 feet wide; west of Fifth avenue a block is generally 800 feet long and 200 to 204 feet wide, the long streets being 100 feet wide and the cross streets 60 or 100 feet wide. If you ask the distance of anyone on the street he will usually reply that it is so many blocks.

heat the hotel. Most of the great hotels in the United States have their own power plants.

In installing the plant it is of the greatest importance to protect the hot pipes from the outside water. This may be accomplished by proper drainage.

It is also important, by the insertion of expansive joints of special construction and fixed in a particular way at proper distances, to compensate for the expansion of the pipes and to keep them in position. In this case it is always advantageous to place the boilers deeper than the building to be heated. Finally, the pipes should be isolated. This is best accomplished by laying them in cemented conduits easily inspected, and by wrapping them in asbestos paper, hair felt, and linen, to prevent loss of heat so far as possible. The pipes then remain serviceable from five to fifteen years, according to the temperature to which they are subjected; furthermore, those protected by a covering of incombustible mineral wool last still longer. This question has been made the subject of an extended series of experiments. Hot water has the worst effect on iron, whereas steam is harmless.^a

What I have said is certainly far from exhausting the subject of what New York has to show with reference to buildings for collections and technical scientific contrivances, in their bearing upon museum interests. Lack of time, however, has compelled me to limit my observations, nor can I in making my report discuss everything that I have seen.

II.—ALBANY.

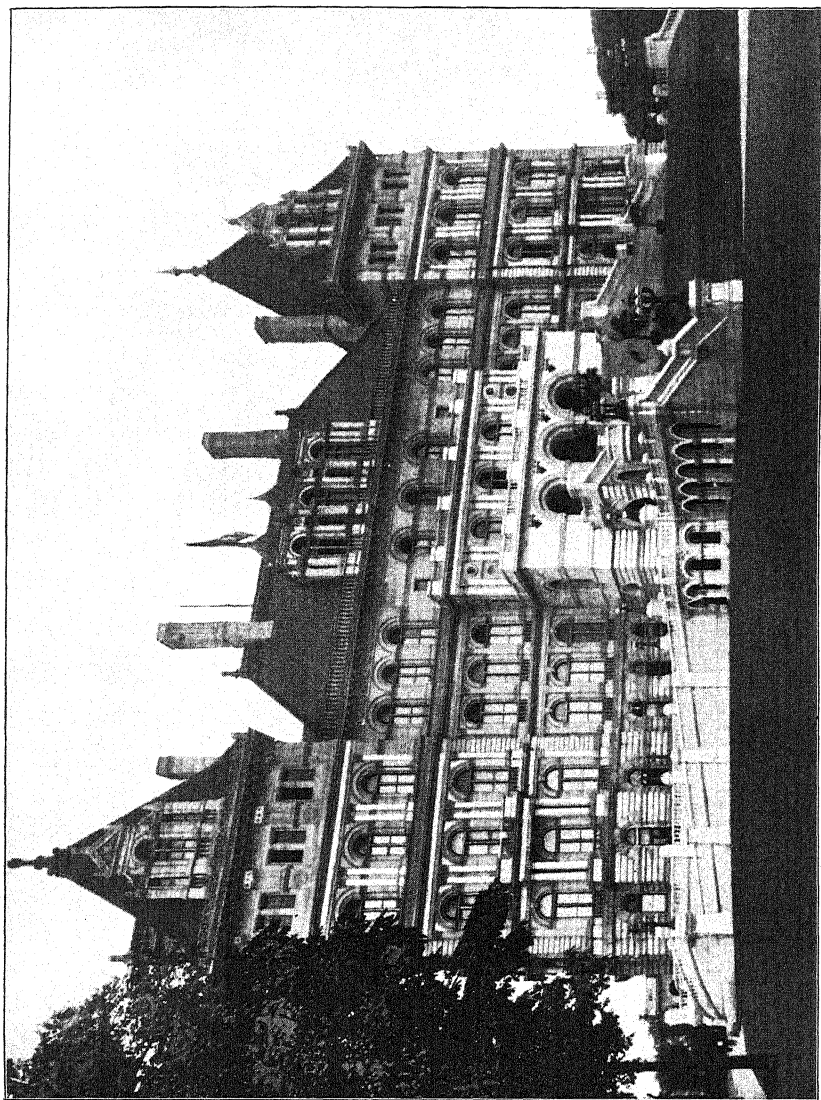
[On the Hudson River, the capital of the State of New York, with over 100,000 inhabitants.]

7. UNIVERSITY OF THE STATE OF NEW YORK.

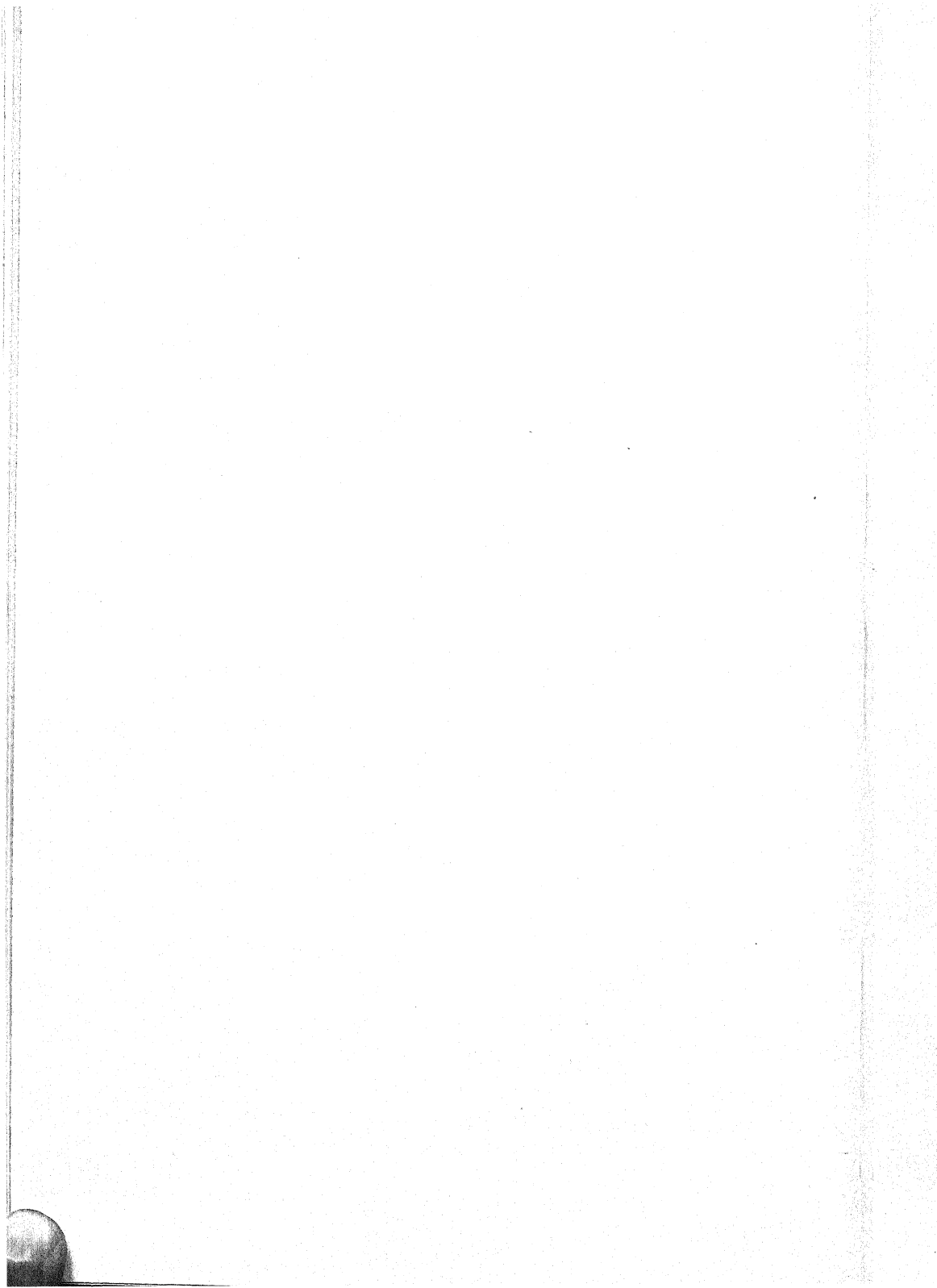
This university was founded in the year 1784 by the State of New York, by which it is maintained and governed. It is, however, not a didactic university, but a kind of supervising administrative department of instruction, unique of its kind, and traceable to the influence of the French philosophers of the eighteenth century.^b The institution,

^a I obtained the greater part of these remarks concerning heating from the report of Water Inspector Hoech, 1898, at the Imperial embassy in Washington, which was kindly placed at my disposal by the royal Prussian ministry of public works, and which is also referred to in the *Centralblatt für Bauverwaltung*, XIX, pp. 69 to 70. I consulted, besides, the work of R. C. Carpenter, *Heating and Ventilating Buildings* (New York, Wiley, 3d. revised ed., 1898, xiii, and 411 pp.), particularly pp. 260-267, *Transmission of Steam Long Distances*, and pp. 197-200, *Protection of main Pipe from Loss of Heat*. Mr. Carpenter is professor of experimental engineering in Cornell University, Ithaca, New York.

^b See S. Sherwood: *University of the State of New York: Origin, history, and present organization*, in *Regents' Bulletin* No. 11, January, 1893 (Albany), pp. 201-300, as well as *Bulletin* No. 38, June, 1897, *Laws, Ordinances, and By-laws*, pp. 401-504. The secretary's report in *Regents' Bulletin* No. 25, May, 1894, pp. 324, also gives much interesting information concerning the organization, administration, etc. Further, *Handbook* No. 1, *Outline*, pp. 42 (1893).



STATE CAPITOL AT ALBANY.
East front.



perhaps, most resembles the "Université de France," founded by Napoleon in 1808. It is trying to solve the universal problem of extending culture, and has supervision in the State of New York over 34 universities and academic high schools (colleges of liberal arts), 76 professional technical schools, 139 academies, and 559 high schools (that is, secondary schools) with 101,630 scholars, over 183 libraries, museums, and the like, as well as over 523 organizations which are affiliated with it—that is, over 1,514 in all. "Its activity embraces not only the field of work of academies, colleges, universities, professional and technical schools, but also that of libraries, museums, courses of lectures, and the like." It is governed by nineteen unpaid regents (who are elected in the same manner as Senators of the United States, and who are the only life-tenure officers in the State of New York), together with the governor, the lieutenant-governor, the secretary of State, and the superintendent of public instruction, with a chancellor and vice chancellor at the head, who are likewise elected and serve without pay.

The university confers degrees after examinations, as well as licenses to practice medicine, dentistry, and veterinary medicine in the State of New York. It annually aids the institutions named to the extent of \$250,000, provided each of these institutions raises a similar sum for the same purpose, and it aids public libraries to the extent of \$50,000, on the same condition. Its annual budget amounts to \$500,000 (1899). Like other States of the Union, the State of New York has a department of public instruction which directs the elementary schools (free common schools), and nine-tenths of all the children attend these schools; but no other State of the Union has a department which attends solely to the interests of higher instruction. As such this department exercises jurisdiction over the institutions which are placed under its control. It holds annually a congress for higher instruction, which is attended by delegates from other States and universities, and whose proceedings are published.^a It was lately proposed to establish in the State of New York a department of education, which was to embrace the university and the department of public instruction, with the chancellor of the university as responsible, executive, and administrative head, but the project has so far not been carried out.

The university is organized into six departments: Administration, colleges, high school, home education, library, and museum. It has its offices in the capitol. The administrative department includes the executive, the general supervision, the finances, and the duty of making reports.^b The college department conducts the examinations

^a For example, Thirty-seventh University Convocation of the State of New York, June 27-29, 1899, in *Regents' Bulletin* No. 48, October, 1899, pp. 209-431.

^b See Annual Regents' Reports beginning with 1787, Proceedings of the convocation beginning with 1890, in 47 numbers.

and confers degrees. There are 68 different examinations and 120 branches. They are held in the above-mentioned 760 institutions of learning themselves, as well as at different central localities, where ten or more candidates appear.^a The high school department organizes instruction and lectures in wider circles.^b The home education department has six subdivisions: Extension teaching,^c study clubs,^d exchanges, traveling libraries, public libraries,^e and library school. The State library department manages the library; the State museum, the museums.

In the following pages I shall confine myself to the last two institutions, and shall, moreover, consider only the traveling libraries, the exchange system, and the library school, since these are connected with the library.^f All three belong to the Home Education Department.

NEW YORK STATE MUSEUM.

The State Museum is a museum of natural history, whose beginnings reach back to 1836, when the geological survey of the State of New

^a The examiners are appointed and paid, which requires over \$25,000. Examinations are held in law, medicine, dentistry, veterinary science, accounting, commerce, library science, languages, literature, mathematics, astronomy, physics, chemistry, geography, descriptive natural sciences, physiology, hygiene, history, political economy, stenography, and other subjects. See Annual examination reports from 1894-1897, and Examination bulletins, in 16 numbers: For example, 4, Law syllabus, 116 pages, 1895; 7, Medical syllabus, 126 pages, 1895. Annual college reports, beginning with 1898; College department bulletins: For example, 4, Professional examination papers, 188 pages, 1899; 13, Business syllabus, 59 pages, 1900.

^b See Annual High School Department Reports beginning with 1898, High School Department Bulletins in 18 numbers, for example: 4, Academic Examination Papers, 303 pages, 1899; 6, Associated Academic Principals' Proceedings of the Fifteenth Annual Conference, 184 pages, 1900; 8, Academic Syllabus, 224 pages, 1900.

^c See Annual Extension Reports beginning with 1894, Extension Department Bulletins in 30 numbers, for example: 28, Report of Extension Teaching Division, 26 pages, 1898; 30, Report of Summer School Division, 44 pages, 1899; further, Extension Circulars, 34 numbers, and Extension Syllabuses, 80 numbers.

^d See Extension Bulletin 23, Study Clubs, Annual Report, 90 pages, 1898.

^e This subdivision (Public Libraries Division) is charged with the duty of stirring up local libraries and advancing their interests in every manner. It does this by counsel, by making up lists of the best books with remarks, by cash appropriations up to \$200 a year each, the latter not only to public, but also to all other free libraries, as well as to any 25 taxpayers who ask for it together in places where no libraries exist. An equal amount must be raised by the institutions or persons concerned. The budget of this subdivision amounts to \$50,000. See also Extension Bulletin 27, July, 1899; Public Libraries 8; Public Libraries Annual Report, 1898, Albany, 1899, 70 pages (this report, drawn up by Dewey, is a model of its kind).

^f Considerable general information may be derived from a series of small handbooks, some of them illustrated, such as (1) Outline, (2) University Law, (3) High School Department Examinations, (4) Home Education Department, (5) New York State Museum, (6) List of Publications, (7) Library School, (8) Public Libraries Division, (9) Organizations and Institutions, (10) Study Clubs, (11) Library Handwriting, (13) Paleontology, (14) Library School Summer Course, (15) Guide to Excursions in the Fossiliferous Rocks of New York State, (50) Views in the New York State Library, (54) University of the State of New York.

York was established. This survey at that time embraced entomology and botany within its scope. In 1857, jointly with the New York State Agricultural Society, a building was erected for the growing collections and called the Geological and Agricultural Hall. In 1870 it received the name State Museum of Natural History. It is now called the New York State Museum. In the course of years the space became inadequate, so that a portion of the great paleontological collection had to be placed in the old State House, the entomological, botanical, and ethnological collection in the capitol; but a great new building is planned for the State library, which will also accommodate the museum collections until a special building shall become necessary for them also. There is a prospect that the plan will soon be carried out, since present conditions are untenable.

The annual budget amounts to \$40,000. The director is State geologist. There is also a State paleontologist, a State entomologist, and a State botanist. Each of these has one assistant, and there are also six other employees. In summer, however, a large number of persons, mostly young scientists, are appointed in the geological survey. The collections are open daily except Sunday from 9 a. m. to 5 p. m.

The State museum and the geological and natural history survey have published since 1842: *Natural History of New York*, 30 quarto volumes on zoology, botany, mineralogy, geology, agriculture, paleontology (mainly), with many plates and maps; annual museum reports since 1889; geologist's annual reports since 1881; botanist's annual reports since 1869; entomologist's annual reports since 1882; seven volumes of museum bulletins, in 34 numbers, since 1887; three volumes of museum memoirs since 1889; an economical and geological map of the State in two editions, and some handbooks, such as: 5, *New York State Museum* (28 pages); 13, *Paleontology* (8 pages); 15, *Guide to Excursions* (120 pages); 16, *Entomology* (12 pages); 17, *Geology*. All these valuable publications relate only to things found in the State of New York, and are to-day even more zealously continued. Since 1836 more than \$1,500,000 has been expended on the geological survey.

The museum is a provincial museum in the best sense of the word, which in its way reminds one of the Stuttgart Provincial Museum. Its most renowned constituent part is the great geological and paleontological collection of James Hall, for many years State geologist, who had already in the eighties sold a portion of his private possessions, the collection of type specimens, to the American Museum of Natural History in New York for the sum of \$68,725, and whose property left at his death, especially rich in fossil invertebrates, will perhaps be purchased for the State museum for \$60,000. Since the exhibition will not be maintained much longer in the overcrowded main museum and in the other buildings mentioned, I call particular attention only to the excellent order prevailing throughout, and mention as especially belonging to the provincial collection the great transparent grindings

of stones; minerals and fossils; the fossil invertebrates; the collection of general mineralogy and lithologic geology; the selected specimens of mammals and birds (also the other animals of the State); an excellent assortment of domestic fowls, with their eggs shown alongside; the Gould collection of shells; and, finally, the relief maps of the State (1 mile to the inch).

The furniture for many years has been of wood.

As a special feature I may mention that schools in the State of New York may borrow for a short time small collections for purposes of instruction.^a

The New York State Museum, established in a spacious up-to-date building, will certainly in the future assume a commanding place among the museums of the country.

NEW YORK STATE LIBRARY.

The New York State Library is located in the third, fourth, and fifth stories of the west wing of the capitol, and ought to afford space for 3,000,000 of books. The space has, however, from time to time been otherwise occupied, so that now 150,000 volumes have to be stored in boxes. The library consists of 300,000 volumes, 125,000 bound duplicates (over 200,000 unbound), 250,000 manuscripts,^b and 150,000 pamphlets—a total of over 1,000,000. As already remarked, plans have been drawn for a great new building for the library and museum combined. The university, together with the library and the other collections, now occupies about one-third of the great capitol building, which I must first mention for it holds a place among the most remarkable buildings of the United States.

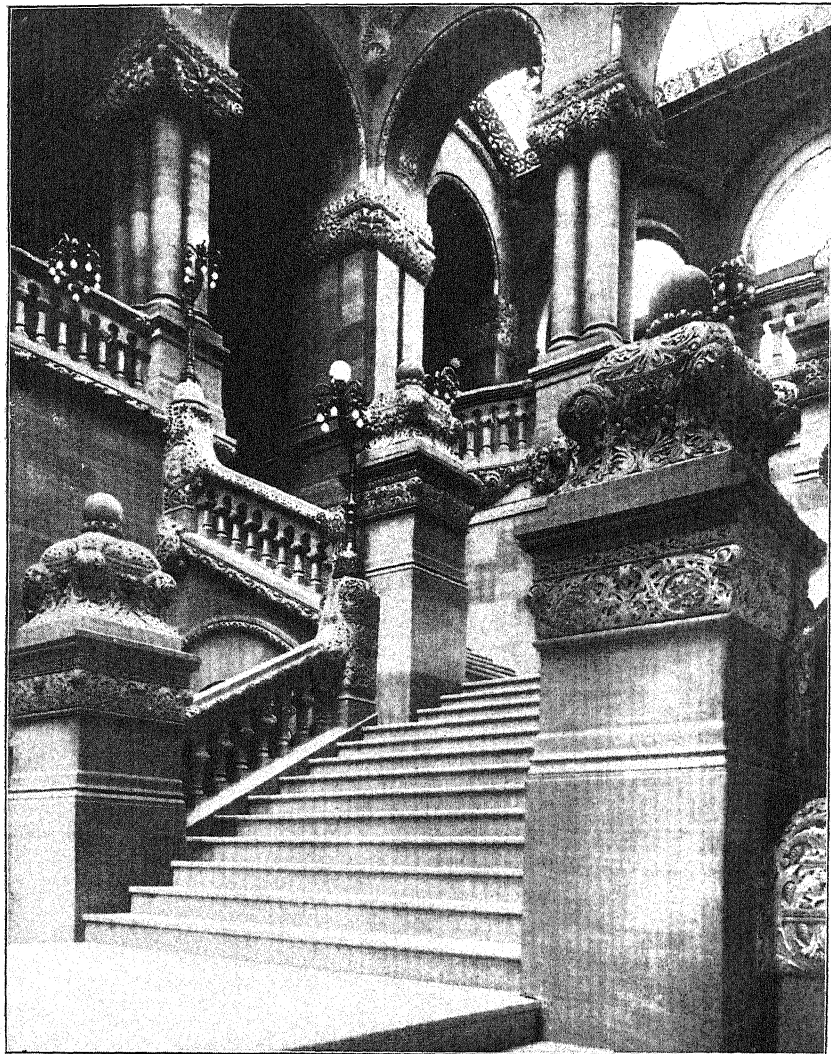
E. A. Freeman, of Oxford, writes:^c

But on the whole the American city which struck me most was Albany. Rising grandly as it does on both sides of the noble Hudson, it suggested some of the ancient cities on the Loire. It has the advantage, rather rare in American cities but shared with Albany by the Federal capital, of having one dominant building. The general look of the city carried me so completely into another part of the world that, if any one had come up and told me in French, old or new, that the new capitol was "*le château de Monseigneur le duc d'Albanie*," I could almost have believed him. * * * The building has a most successful contour; in its details it is a strange mixture of styles, not so much confounded as used side by side. This is accounted for by the history of the building, and by the employment of more than one architect. * * * There are parts which I can not at all admire; but there are other parts, those in which the column and round arch are employed, which certainly pleased me as much as any modern building that I have seen for a long time. When I say that the arches of the senate chamber seemed to me, as far as their general conception goes, worthy to stand at Ragusa, some will understand that I can say no more.

^a See the small handbook of the Home Education Department: Loans to academies, p. 4, section of Museum illustrations (1898). With the loans of books and photographs mentioned in the chapter on traveling libraries these loans of objects are connected.

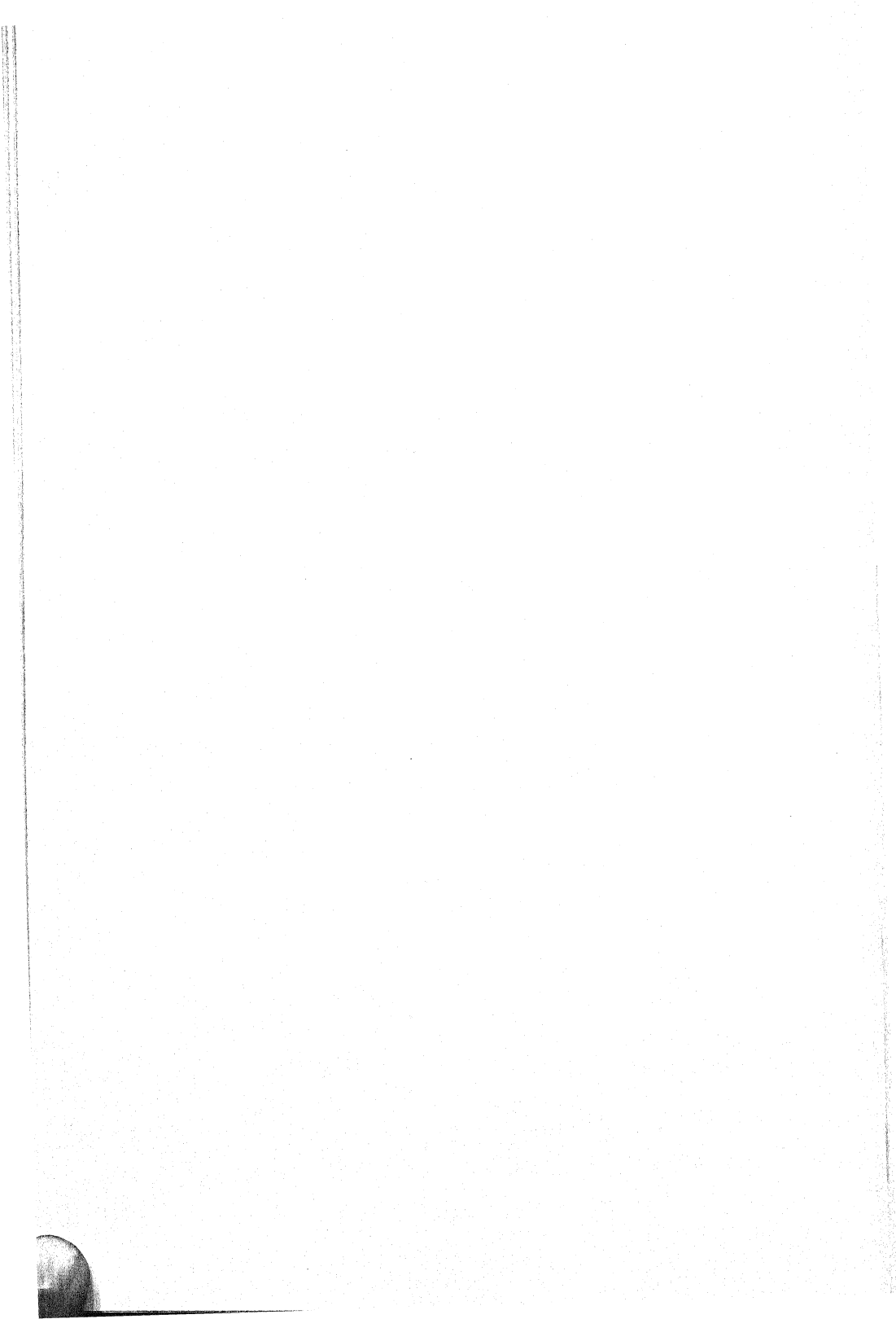
^b These are documents such as we preserve in our archives.

^c Some Impressions of the United States, New York, 1883, p. 245.



STATE CAPITOL AT ALBANY.

West staircase.



Albany is a hilly city. The hill on which the capitol is situated rises 150 feet above the Hudson, 51 feet above the level of the wide main street, which runs up from the river. The building is 300 feet long, 400 feet wide, and 108 feet high, and will have a tower 300 feet high. (The Reichstag building in Berlin is 395 feet long, 254 feet wide, and 81 feet high.) The inner court is 92 feet long and 137 feet wide. A straight staircase, with four landings and seventy-seven steps, the lower sixteen 100 feet wide, extends outward 166 feet from the building. The whole occupies 3 acres. It is built of white granite in the free renaissance style with wonderful stone masonry. The three staircases are of reddish sandstone, the western being particularly effective. Eleven elevators render access easy from one part of the building to another. The basement contains 144 rooms for heating, lighting, ventilating, storage, etc. The administrative rooms and the governor's magnificent state hall are on the first and second floors. These two floors combined include over 120 rooms. On the third floor are the magnificent halls of the two houses, the court of appeals, the historical collection, the library, together with over 50 rooms. The fourth story contains over 40 rooms, among them the offices of the university, the entomological, botanical, and ethnological collection of the State museum (the latter with rich archeological finds from the State of New York and its vicinity). There are also on the fourth and fifth floors additional library rooms. The building was begun in 1867, occupied in 1879, and finished all to the central tower in 1898. Its cost was originally estimated at \$4,000,000, but over \$25,000,000 have already been spent upon it. The architects were Fuller, Laver, Eidlitz, Richardson, and Perry.

The library, with its appliances planned and executed in the most minute detail, some of them in beautiful and artistic style, is particularly worth seeing. It is open daily, except Sunday, from 8 in the morning until 10 in the evening; lighted in the evening by electricity. On Saturdays, holidays, and from July to September, it closes at 6 p. m. It is accessible only from the third story. Until recently the director was also secretary of the university. He has under him 31 librarians, archivists, assistant librarians, assistants, etc.; 51 employees in all, and among them 37 women. The annual budget amounts to \$75,000. The west wing of the capitol may be said to form on the third story a single room 290 feet long, 40 to 60 feet wide, the middle of which is occupied by the great reading room, 53 feet high, 67 feet long, 40 feet wide, which is connected with five additional reading rooms on the right and five on the left, all occupied with bookstacks, altogether with more than 300 seats. There are, moreover, two administrative rooms. The reading rooms are in part adorned with palms and other living plants. On the window side one may glance along the entire suite of nine rooms, 290 feet long, which, together with the fine view of the country and the distant mountains which may be enjoyed from

the windows, makes a very pleasing impression. On the fourth and fifth floors the same amount of space is at the disposal of the library, making in the two stories combined forty-one additional rooms, for the library school, the section of public libraries, the duplicate section, the library museum, the bindery, the children's reading room, etc. The library school has a lecture room in the seventh story of a corner pavilion. The museum contains a collection relating to library buildings and library administration of several thousand books, pamphlets, samples, formularies, models, etc., which are very exactly classified and catalogued. The collection is unique of its kind and extremely instructive.^a

In the New York State Library particular attention is paid to law (60,000 volumes, principally American codes),^b medicine (25,000 volumes),^c sociology (36,000 volumes), instruction (16,000 volumes), history and kindred subjects (40,000 volumes), genealogy, bibliography, and Americana, as well as everything relating to the State of New York. It contains also a special collection of female authors and of books for the blind (of whom there are 5,000 in the State of New York) and for children, as well as for the State officials residing in Albany. About 2,200 periodicals are received by subscription or donation.

The building is fireproof. Some rooms contain extinguishers, lines

^a In order to give an idea of the contents of the library-museum we add here the headings of the catalogue of the collection: Charts illustrating selection of books; Stacks; Lights, standards, etc.; Chairs, easels, floor covering, reference bookcases, shelf supports, folio shelving, shelving, tables, trays and trucks, miscellaneous fittings; Regulations for readers; Administration; Executive. Accession: Book plates, order, sample books (showing stamping, plating, etc.). Catalogue: Back blocks, bulletins, catalogues, cost of printed catalogues, catalogue drawers, drawer checks, drawer handles and labels, drawer rods, guides, handwriting, linotype, printed catalogue, card racks, size rules, catalogue trays, cataloguing miscellany. Classification; Reference. Loan: Card charging systems, loan desks, indicators, ledgers, registration books and cards, statistics, loan miscellany. Binding and repair: Binders, book corner protectors, book corners, materials, mending. Shelf: Book supports, dummies, maps and map cases, newspaper files, pamphlet cases, shelf labels, holders and guides, shelf lists, shelf miscellany. Care, cleaning, safety of building. General libraries: Home libraries, libraries for the blind. Children's reading: Historic development. Literary methods and labor savers, office fittings: Book holders, clips and paper fasteners, drawer fittings, files, folios, mailing envelopes and cases, paste, mucilage, etc., paper, pens, pencils, and erasers, punches, supplies, stamps, trays. Scrapbooks and files; Notebooks; Indexing; Engraving.

^b In the excellent annual report of the director for 1898 it is stated on p. 28 that the time is near at hand when every prominent lawyer of the State of New York will be connected with the library by telephone.

^c The report of the director for 1898, p. 35, expresses the opinion that the time is at hand when most of the physicians, also, of the State of New York will be connected by telephone with the library. In both cases a fee of 25 cents per half hour is to be paid when more than half an hour is required to give the information called for. The medical library is also used in the State of New York as a circulating library in the same sense as the organization of the traveling libraries described on a following page.

of hose, and alarm indicators. Only a part of the floors are covered with linoleum. They are mostly of parquetry or brick, with strips of carpet. Some of the book rooms proper have iron grates. The bookstacks and bookshelves are mostly of iron, the other furniture of wood, both strikingly elegant. There have recently been introduced sheet-iron waste-paper baskets with covers, because one of the ordinary waste-paper baskets was once set on fire. The folio volumes lie in their stacks on rollers, like those mentioned in connection with Columbia University. The cases for maps and photographs are constructed in a very practical manner. The separate drawers drop when drawn out to an angle of 75 degrees, so that the sheets may not only be conveniently examined as if on a slanting desk, but may also be placed for closer inspection on a lattice which covers the drawer. The books are bound in twelve colors, corresponding to the principal languages of the globe; for example, black represents German. This applies to all books which are bound for the library or in the library itself, and makes it easier to find them quickly. Current periodicals are kept in pasteboard boxes. Movable stacks for transporting books are constructed in a very practical manner.

For the library proper two extra elevators are in use. They are installed in a very ingenious manner, provided with electric bells and telephone. There are also staircases, partly of iron, partly of wood.

The arrangements for the care and use of the books show the greatest skill and attention to every detail.

The arrangement of the entire library is strictly according to the system devised by Melvil Dewey, who has been director since 1888. According to his ingenious decimal system, the figure signs contain the title of the book in a nutshell, and the books are arranged strictly according to the figure series. Each book has, therefore, its definite place and its prescribed sign. The system, which is followed elsewhere only in Columbia University and in smaller libraries, has here completely demonstrated its value. The card catalogues are made very accurate. They have in America extremely practical arrangements for such card catalogues. Even the price of the book is given on the later printed catalogue cards, which are furnished by the Library Bureau in Boston. Up to the present time there are over 300,000 cards in use, the greater portion arranged according to authors. Author and subject cards are kept separate, but in cases standing side by side; the author catalogue is in 140 drawers, each containing 1,200 cards; the subject catalogue is in 112 drawers. They are both made in duplicate. There is also an alphabetical list of all the authors represented in the library. In the accession catalogues one may find all possible data relating to any book.

The library publishes the following: Annual reports since 1819 (the eighty-first, of 1898, has 105 pages and is illustrated); bulletins with reports since 1891; additions to the bulletins since 1890, 4 numbers;

legislation bulletins since 1890, 10 numbers; history bulletins since 1898, 3 numbers; library school bulletins since 1891, 3 numbers; public libraries bulletins since 1893, 6 numbers; bibliography bulletins since 1895, 18 numbers; library catalogues since 1856, 9 volumes; indexes of university publications since 1897; syllabuses which contain bibliographies; a traveling library; finding lists, a mountain-side library, young people's libraries, a library for the blind, etc., in 56 and more numbers; annual lists of best books since 1895, and others; also many historical publications. In 1898, all told, 365,000 copies of such publications appeared.

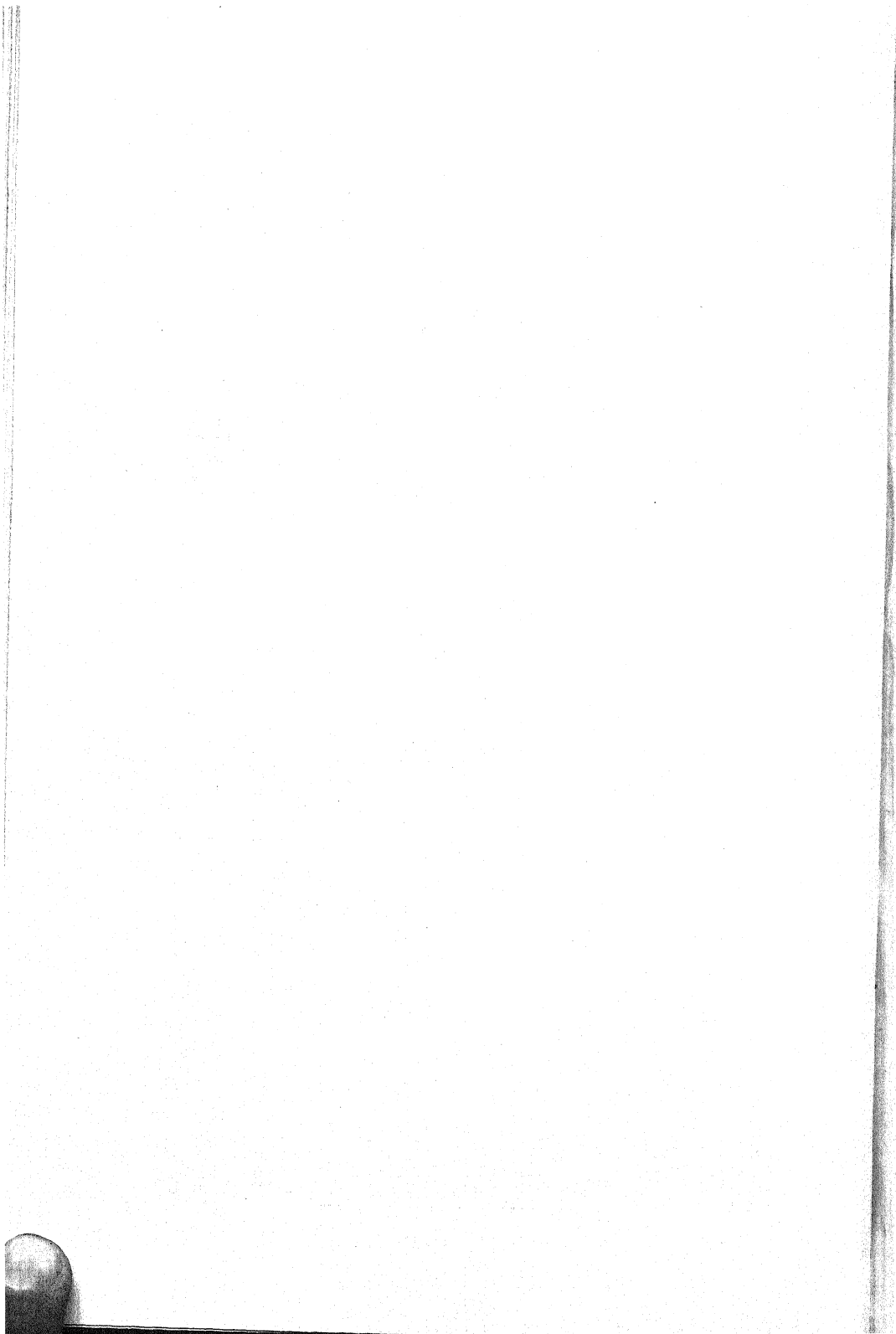
This is further distinguished from many other libraries by the divisions for traveling libraries, exchange of duplicates, and the library school.

Traveling libraries division.—The special traveling libraries division, which has existed since 1892, contains about 45,000 volumes. Lots of 25, 50, 75, or 100 of the best books are lent for six months to public libraries, to any twenty-five taxpayers who meet in one place, to schools, associations for instruction (extension centers), study clubs, reading circles, as well as to any other organizations which are registered as such at the university and need books, for which security is to be given, and from 50 cents to \$4 each is paid for transportation expenses. One hundred volumes are, for example, divided into fiction (22 per cent), history (18 per cent), biology (13 per cent), travels (11 per cent), science and useful arts (9 per cent), sociology (5 per cent), religion and ethics (4 per cent), fine arts (3 per cent), other literature (15 per cent). There are forty-one such miscellaneous sets, several of which have been duplicated ten times. The percentage of each subject represented is, of course, not always the same in the different sets. There are, moreover, seventeen collections of 25 or 50 volumes each on special subjects, such as political economy, finance, agriculture, French history, history of the United States, literature, etc. For these sets the best books in the English language are selected. There are also collected and lent out small libraries which relate not only to a special subject, but which also include what is more remotely connected with this subject and which therefore encourage the student to consider and study any particular question from every point of view. Such assortments of books are called environment libraries. Teachers, study clubs, and reading circles may themselves select books from the lists to a total value of \$100 (combined libraries) and take them on the same conditions. For purposes of instruction teachers may also get as many copies of one and the same book as they may need for their pupils. The average price of each book may be placed at about \$1. The books are sent out in handsome locked oak cases, which cost about \$14 for every hundred volumes. Exact statistics regarding their use are returned to the library, which incloses in each book a card for this purpose. In 1899, 557 series were sent to 420



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STATE CAPITOL AT ALBANY.
Home education department, with traveling pictures.



places. In 1898, 540 series were sent to 396 places, comprising 18,951 books, which passed through the hands of a large number of readers. In spite of their being instructive I can not here go into details with statistics on this subject.^a A writer on this peculiar and, so far as I know, unique arrangement says:^b

The State of New York can well afford this offer of books to her citizens. The plan is at once generous and, in the highest sense, profitable, and is confidently commended to the consideration of other States.

In a like manner the State library lends from its great collection for purposes of instruction, photographs of paintings, portraits, buildings, and the like, including glass and frames, when desired. It also sends out wall pictures with magic lanterns.^c A small fee is charged to cover the expense of shippage. Plate 12 represents a room of the library where such pictures are hung.

The *division of exchanges*, a peculiar establishment, is also connected with the library. There are 350,000 duplicates. Every library of the State of New York, every school, every lecture circle, every study club, every reading society, which is registered as such at the university and is organized according to the prescribed rules (we saw above that there are now in that State 1,511 such centers, large and small), may deliver to the university books for which they have no further use. In return for these they receive others of equal value, according to the choice of the recipient. About 20,000 volumes and pamphlets are now annually exchanged in this manner. This may, therefore, be regarded as an exchange book trade, which conducts its business without expense to the persons interested, who do not even have to bear the expense of transportation. All the surplus copies of the government publications of the State of New York are also placed in this duplicate collection, as well as the surplus stock of the works, books, pamphlets, handbooks, bulletins, reports, etc., printed by the university itself, for free distribution. Of the latter, hundreds of thousands

^a See, among others, Extension Bulletin No. 27, 1899, pp. 23-46.

^b See W. R. Eastman, "A New Aid to Popular Education: Free Traveling Libraries," *The Forum*, January, 1895, pp. 616-621. I can not here reproduce the many interesting details. See, also, the small handbooks of the New York State Library: Traveling Libraries, 12 pages (1898), and Loans to Academies, 4 pages (1898), as well as the numerous Finding Lists and Subject Lists. For example, Finding List 41 (March, 1900) contains 50 volumes on religion (2), sociology (4), zoology (1), music (1), fiction (15), literature (5), descriptions and travels (7), biographies (6), history of South Africa (8), history of Philippines (1), subject list on education (subject 370, according to the Dewey system), 25 of the best books on education (February, 1900), among them books by Lange, Preyer, Spencer, Pestalozzi, and a biography by Fröbel; subject list on French history (subject 944), 50 of the best books on French history, among them Guizot, Scott, Taine, Sainte-Beuve, Mignet, Dickens, Hugo.

^c See the small handbook of the New York State Library, Loans to University Institutions: Wall Pictures, 12 pages (1898).

of copies are printed. This department also exchanges apparatus, pictures, etc., for purposes of instruction.^a

Library school.—It is now almost a rule in the United States that everyone who seeks employment in a library shall have attended one of the seven library schools which are located in Albany (New York State Library), Brooklyn (Pratt Institute), Philadelphia (Drexel Institute), Champaign (Illinois State Library School, University of Illinois), Washington (Columbian University), Madison (University of Wisconsin), Los Angeles, California, Amherst, Massachusetts, and Cleveland, Ohio. The four latter are only summer schools. Regular lectures on bibliography and library science are also delivered in a number of universities and colleges (Bowdoin, California, Colorado, Cornell, Iowa, Maine, Michigan, Wellesley).

The first school of the kind to which all others are more or less indebted for their existence was founded in 1887 at Columbia University, New York, by Melvil Dewey, who was at that time director of the university library, and removed to Albany in 1889. It includes a faculty of ten instructors, each of whom represents and teaches particular branches of library science. Six of the instructors are women, an example of the great attraction this branch has for women in America. The special branches are: Library economy, cataloguing, lending system, reading, bibliography, classification, history of libraries, advanced cataloguing, reference work, binding, library printing and editing, dictionary cataloguing, library building, indexing. The number of pupils is limited to 50. For admission an examination or the possession of a certain college degree is required. Pupils under 20 years of age are not received. The course is for two years, and lasts for thirty-eight consecutive weeks in the year. The weeks consist of five working days of eight hours each. Every pupil receives a table with all library appurtenances, at which he may work from 8 o'clock in the morning until 10 in the evening. The tuition fee for two years amounts to from \$80 to \$100. The expense of one year's attendance at the library school in Albany, including tuition fee, room, board, books, official study, travels, etc., amounts to from \$325 to \$625.

Instruction consists of the following: (1) Lectures by prominent librarians, publishers, booksellers, printers, bookbinders, and the like, and by the instructors of the school. (2) Reading and reports from books belonging to the special library school on the subjects of study. (3) Solving of difficult problems relating to cataloguing, bibliography, aids to readers, and the like, with debates. (4) Seminary exercises. (5) Practical training in the State library itself, as well as in the small libraries of the city. (6) Visits for the purpose of study to the libraries of New York, Boston, etc., to the great publishers, printing offices, bookbinderies, art institutes, bookstores, book auctions, secondhand

^a See Handbook No. 1, Outline, pp. 36 and 37, and No. 10; Study Clubs, p. 13.

bookstores, etc. (7) Object lessons: Everything referred to in the lectures is, when possible, exhibited in the original or in models, plans, or drawings. Thus, for example, one may see ten different kinds of American and European library book stacks in practical use beside one another, and by actual trial become acquainted with the best. Different portions of the library are fitted up according to different models, in order that the students may learn by comparison. (8) Finally, the pupils are made acquainted with the above-described educational methods of the New York State University, as they are in many respects related to library interests.

In the first year the following subjects are treated: Exercises in cataloguing for beginners, elementary bibliography, accession department work, dictionary cataloguing for beginners, classifying for beginners, shelf work or disposition of books, systems of lending, and of book-binding. For students of the first and second years together, course of reading, scope and founding of libraries, government and service, regulations for readers, library buildings, reading, literary methods and book making, library bookkeeping, library museum, personal collections. In the second year, are taught bibliography for advanced students, reference work, exercises in cataloguing for advanced students, dictionary cataloguing for advanced students, classifying for advanced students, history of libraries, and original bibliography. Finally, a dissertation is required, and then, after an examination has been passed, a degree is conferred (bachelor, master, or doctor of library science). The best scholars receive scholarships and fellowships, up to \$500, and may look forward to an early appointment in Albany. Up to October, 1898, the library school had filled 642 positions with its pupils. Summer courses are also held during the holidays; and private instruction and instruction by means of correspondence are also given.^a

The existence of such schools explains the advanced condition of library science in America.^b

It is recognized "that the influences of the New York State Library are as yet the strongest that exist to raise the standard of librarian-

^aSee also Handbook No. 7, Library School, 1897, 82 pages; Handbook No. 11, Library Handwriting, with very many useful hints, 1898, 24 pages; Handbook No. 14, Library School, Summer Course, 1899, 28 pages; and State Library Bulletins, Library School No. 3, April, 1899, 12th Annual Report of Library School, 1898, 25 pages.

^bIn Germany a chair for library science ("Buch-und Schriftwesen") exists only in Göttingen and Leipsic. (In Leipsic, however, the professor does not lecture.) Other lectures on library science in German universities are sparing and more of the archeologic-historical kind. In Prussia, after a voluntary service of two years in a library, an examination must be passed before appointment, but not in Saxony and Bavaria. The German library employees are, however, mostly scientists. In America there are but few in this particular branch, while among us there is rather a lack of specially educated minor employees. I think that more attention should be paid to library science in the German universities than is now the case. If libraries are intellectual eating houses, care should be taken that the dishes are well served.

ship and to advance the best educational work now carried on by the modern library." ^a The New York State Library aims at the greatest conceivable utilization of all of its literary treasures. Its object is to send every book where it will do the most good. I left this institution carrying with me the highest respect for its director's talent for organization.

The University of the State of New York contributes an astonishing amount to the universal distribution of knowledge in a manner quite peculiar to itself. I am convinced that a great future lies before it. Its work, however, has already received the greatest recognition, as shown by the circumstance that at the Paris Exposition of this year (1900) it received the remarkable number of three first prizes ("grand prix"), one to the State Museum specially for its paleontological publications, a second to the library specially for the establishment of traveling libraries and the home-education department, and a third to the college department for technical education.

III.—BUFFALO.

[On Lake Erie near Niagara, with over 350,000 inhabitants.]

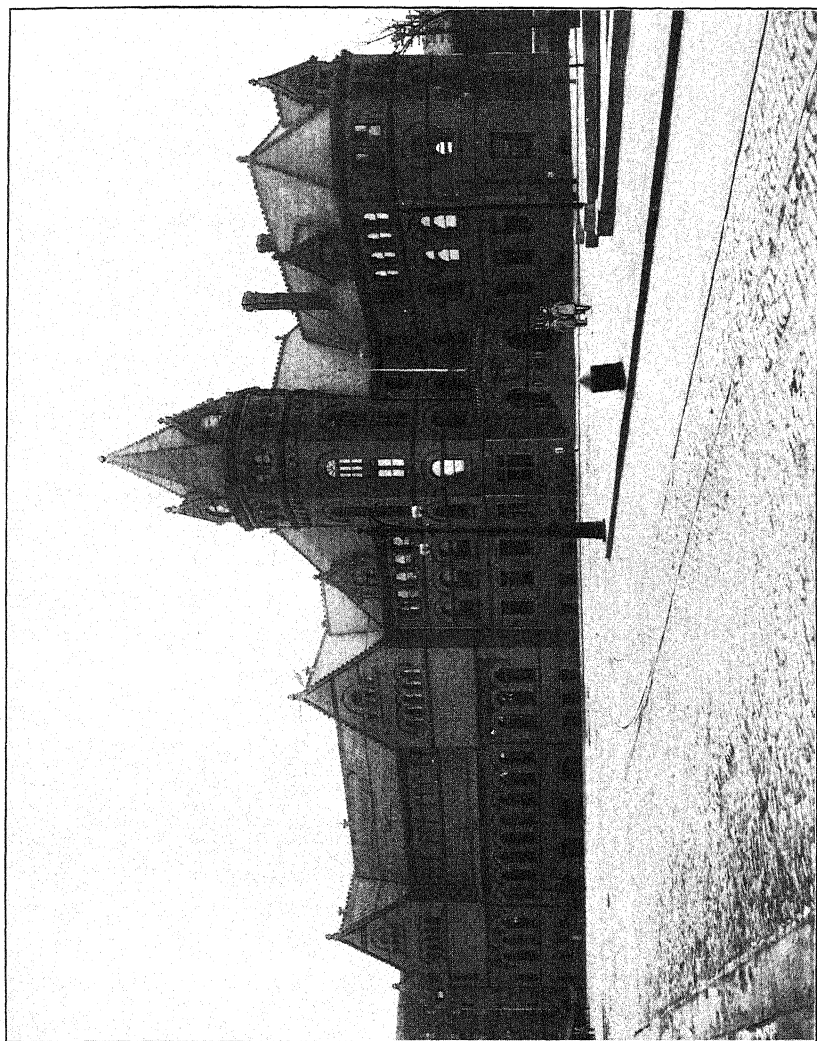
8. BUFFALO PUBLIC LIBRARY.

In the year 1836 the Young Men's Association of the City of Buffalo was founded as a municipal library. In 1885 a house of its own was erected, the Buffalo Library, which, in 1897, was reorganized as the Buffalo Public Library. The building, also called Library and Art Building, is massive and fireproof, in the Romanesque style of architecture, with triangular ground plan, about 300 by 250 by 175 feet in size, and cost nearly \$375,000—about the same amount as the site. Situated on Lafayette place in the midst of the business houses of a great industrial city, the exterior is already badly discolored by smoke. It is now occupied by the following:

In the basement, the museum of the Buffalo Society of Natural Sciences; on the raised ground floor and the second story, the public library; also on the second floor, the collections of the Buffalo Fine Arts Academy and the Buffalo Society of Artists; on the third floor, the collections of the Buffalo Historical Society. Within a short time, however, the entire building will be given up to the library. The Natural History Museum will secure a home of its own from a bequest of about \$250,000. The Art Academy, which was founded in 1862, will, together with the Society of Artists, with which the Art Students' League is also connected, move into the Albright Art Gallery, now in course of construction, ^b for which \$500,000 are to be expended by private individuals. Finally, the collections of the Historical Society, which was also founded in 1862, were to be exhibited in connection with

^a Eighty-first Annual Report, New York State Library, 1899, p. 11.

^b Now finished (in Delaware Park)—1903.



BUFFALO PUBLIC LIBRARY.

the Pan-American Exposition in Buffalo in 1901.^a As all this would make a radical change in the museums mentioned, I limit myself to a few words concerning the Natural History Museum, and speak of the library in a somewhat more detailed manner.^b

MUSEUM OF THE BUFFALO SOCIETY OF NATURAL SCIENCES.

The Natural History Society of Buffalo was founded in 1861. It is under the formal control of the University of the State of New York, in Albany, and its object is the advancement and the study of the natural sciences. Lately it has devoted itself particularly to making collections of the local fauna and flora, and for this purpose is divided into fourteen sections. There is a president at the head of the institution. In 1898 it had at its disposal an income of \$3,500, of which \$625 were derived from membership fees, \$250 appropriated by the city, \$1,250 interest money, etc.

The present director of the museum is a woman (conchologist). The different sections are presided over by professional scientists or amateurs, who serve without pay. The best parts of the collection are the minerals, the fossils, the shells, and the herbarium. A larger series of deformed mound skulls should be noted. The museum contains, all told, about 60,000 natural history specimens; the library, 4,300 books. It is open daily from 9 to 5, Sundays from 2 to 5; admission free. The number of visitors last year was 105,000. The society has 250 members, who pay \$2 or \$5, and 160 corresponding members. The publications are as follows: Annual reports (the one of 1898, with 18 pages; the earlier reports were longer, but none appeared in 1899), bulletins with illustrations (6 volumes); see also "charter and by-laws * * * together with the will of Dr. George E. Hayes * * * 1890." Regular lectures are delivered and meetings of the society are held in one of the larger rooms. The Buffalo Field Naturalists' Club of the Buffalo Society of Natural Sciences, founded in 1880, is affiliated with it. There is also a Buffalo Microscopical Club, founded in 1876, which publishes Transactions.

While the unfavorable exhibition space in the basement, which is only 14 feet high, and the limited means at the disposal of the society have hitherto prevented it from displaying its already considerable collection to the best advantage, it can hardly be doubted that the Natural History Museum of Buffalo will, in its new location, receive

^a The new building, where the collections of the Historical Society are now housed, stands also in the Delaware Park—1903.

^b A paper by W. O. Chapin: The Buffalo Fine Arts Academy, an historical sketch, 1899, 77 pp., and an article in the *Pan-American Magazine*, May, 1900, pp. 2-5, with plan and illustrations of the Albright Gallery, give information regarding the art collections. For information concerning the Historical Society the Annual Report for 1898 (104 pages, with illustrations) may be consulted. The object of this society is to study, collect, and preserve everything relating to the history of the western part of the State of New York and to the city of Buffalo in particular.

an impetus corresponding to the importance of this populous and wide-awake city of the future, to its handsome and favorable geographical position, and to the patriotism of its intelligent inhabitants, who will not remain behind other cities of the Union.

LIBRARY.

The main library is arranged on iron bookstacks with wooden shelves in a hall 164 by 47 feet and 21 feet high. This hall is located on the raised ground floor, which contains several handsome, spacious, well-lighted reading rooms, as does also the second story. The library is excellently fitted up, though not with the elegance of the Columbia University library in New York or the State library in Albany. Under municipal control, as well as under the supervision of the University of the State of New York, in Albany, it is governed by a board of directors, consisting of 10 members, with a president and a superintendent, who is the actual director. It derives its principal income from the city, amounting to four-fifths of four one-hundredths of 1 per cent of the whole taxable property of the city of Buffalo. That amounted to \$8,250 in 1899.^a Its total income is \$90,750. Of this sum, \$40,500 were needed for the salaries of 79 employees. Sixty-seven are employed in the library itself, 12 in the building, including 45 women. One of the higher female employees receives \$900 a year.

There are 150,000 volumes in the library, together with 10,000 pieces of music, etc. There are subscribed to, or received as donations, 285 periodicals and 73 newspapers. The increase for 1899 amounted to 21,000 volumes, which cost \$21,725, and 1,500 donations. Nearly seven thousand dollars was needed for binding. The books are catalogued and arranged according to the Dewey system, which works excellently. There are three special catalogues in use: (1) The dictionary catalogue for the public, which includes the author, title, and subject cards in one alphabetical series; (2) an author and title card catalogue for the employees; and (3) a shelf list. The number of cards of these three catalogues are for each book about four, two, one, respectively; therefore for each book about seven. The dictionary catalogue is well advanced, and replaces a subject catalogue, which is still in use, and which is a shelf list with many references.

The entire force of employees follow with the greatest zeal the one aim to make the library as useful as possible for popular instruction,

^a Boston, with 550,000 inhabitants, in 1897, in a similar manner, gave for like purposes, \$275,000; Chicago, with 1,700,000 inhabitants, \$250,000; Philadelphia, with 1,200,000 inhabitants, \$125,000; Cleveland, with 385,000, \$75,000; St. Louis, with 650,000, \$75,000; Pittsburg, with 290,000, \$67,500; Indianapolis, with 185,000, \$42,000, etc. In nearly every Massachusetts town the dog tax is devoted to the support of the public library. "The more bark, the more book" (*American Review of Reviews*, September, 1899, p. 328).

consequently the greatest imaginable liberality prevails, together with exemplary and painstaking order. Any resident of Buffalo may borrow any book for fourteen days free. A neglect to follow any of the rules is punished by fines, which in 1899 reached a total of \$2,750.^a The library is open daily from 8.30 or 9 a. m. to 9 p. m. (with electric lighting); also on Saturdays and holidays from 11 a. m. to 9 p. m., but on these days books are not loaned out. The children's department is open on school days from 2.30 p. m. until 6 or 7 p. m., and on Saturdays and holidays, that is to say, days on which the schools are closed, from 9 a. m. until 6 or 7 p. m.; Sunday from 2 p. m. until 6 p. m.

Each room has direct telephone communication with every other room. The building being fireproof, it is thought sufficient to depend upon vigilance without any other precautionary measures. The heating is by steam. The engines are located in a separate house.

A characteristic feature of this library, which, indeed, exists elsewhere, though only in a few places, is the open-shelf department. A collection of 17,000 volumes, in wall cases in a room 70 by 30 feet large, is here, under supervision, directly accessible to the public, not only to read on the spot, but particularly to choose for home use. Anyone can go right up to the shelves and take the books out. This is not a so-called reference library, such as every important library possesses in reference works, dictionaries, and the like (there is also such a reference library of 2,000 volumes), but the section was established in order to afford the reader an opportunity to select the books themselves instead of by title only. This method is so popular that in 1899 each book was loaned out on an average sixteen times. The collection also includes German (877) and French books. Of the 17,000 volumes, 10,000 relate to fiction.

In 1899, 888,000 volumes, all told, were loaned out to 57,000 persons in three hundred and five days,^b of which 67 per cent were fic-

^a A book may be taken out for fourteen days and once renewed for an equal length of time. Some new books are lent for one week only. Whoever keeps a book over time is fined two cents a day. The comparatively large total of fines is composed almost entirely of fines for one, two, or three days. Compensation must be made for damages, and lost books must be replaced. Whoever fails to meet his obligations receives no more books.

In the New York State Library at Albany (previously referred to) there is a fine of one cent a day for keeping a book over time. For taking a book out of the library without having it entered the fine is 50 cents. The rules are here very detailed in their conception (see Eighty-first Annual Report of the New York State Library, 1899, pp. 63-67). Formerly in a small town of Ontario, Canada, a borrower was fined a half a farthing per shilling of its value for every drop of tallow which he allowed to fall on a book. This rule is so curious that I can not refrain from mentioning it.

^b The Boston Public Library lent out 1,200,000 books in 1898, the public library in Chicago 1,300,000 (1899, 1,700,000), that in Philadelphia 1,600,000, that in Cleveland 900,000, St. Louis 600,000, Pittsburg 100,000, Indianapolis 300,000, etc.

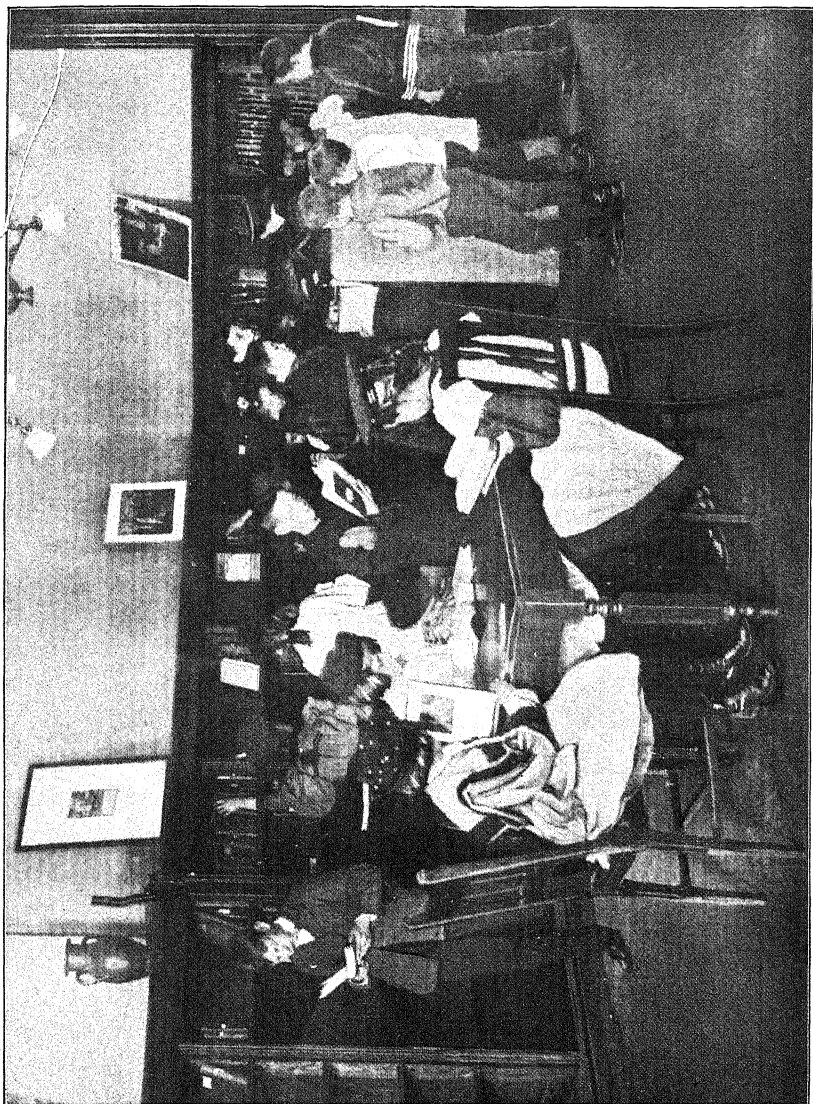
tion,^a 8 per cent literature, 6 per cent history, $3\frac{1}{2}$ per cent travels, 3 per cent natural sciences, etc. As many as 684,000 volumes were borrowed from the main library, and 204,000 from the seven delivery stations in the city, which have been established for the convenience of the public, or indirectly through schools or traveling libraries (see below). In the reading room, moreover, 37,000 volumes were called for from the main library. Since the opening of the public library, out of 2,000,000 volumes loaned, about 1,000, to the value of \$725, have been lost in two years and a half; the present rules, however, encourage the hope that the number will diminish with time. Other special arrangements are the following:

Series of books are loaned to schools for a considerable time, according to the choice of the teacher. The children take these books home with them. Thus in 1899, 22 primary and secondary schools, with 358 classes, received 153,000 volumes and 5,000 pictures. Further, well-selected series, called traveling libraries, are likewise loaned to certain institutions. Thus in 1899, 127 series, with over 4,000 books, were loaned to 28 fire-engine houses, to 7 police stations, and to 5 hospitals (for the employees), which in all brought 8,600 into circulation.

Especial care is also bestowed upon a children's library, which is much frequented. It is for children under 14 years of age. When they come with dirty hands they are sent into the wash room. In a pleasant, well-lighted room, with pictures on the walls and adorned with growing plants and cut flowers, 9,000 books are displayed in open wall cases, freely accessible, under proper supervision, to everybody. Four thousand of these books are fiction. In 1899, 115,000 volumes were lent out of this department for home use. Even colored picture books are lent to small children. On Saturday mornings and Sunday afternoons the assistant in charge spends an hour reading to the children or telling them stories. At Christmas time an exhibition of books which are suitable for presents is held and printed price lists are distributed; for example, see List of Books recommended as appropriate for Christmas Gifts to young Folks (November 28, 1898, 6 pages), in which is noted the age for which each book is suitable. A library assistant is in attendance to give advice on this matter to visitors. There are also printed reading lists—for example, American History for young Folks (4 pages).

About once a month lists of the new acquisitions are posted on bulletins and larger lists are from time to time printed; for example, "No. 17, July 1, 1899, recent additions: History and biography, sociology, science and arts, philosophy and religion, general literature, fiction"

^aThe fact must not be lost sight of that such books may be read much more quickly than others, and that only good ones are procured. See explanatory remarks on this subject by Herbert Putnam, *North American Review*, CLXVI, 1898, p. 664.



BUFFALO PUBLIC LIBRARY.
A corner in children's room.

(4 pages, with 230 titles). Reading lists on special topics are also published, for example, Good books on Electricity for popular Reading (2 pages); Greek Sculpture, in connection with the Exhibition of Casts in the Buffalo Fine Arts Academy (3 pages); Interesting Books for Boys and Girls from 14 to 18 Years (9 pages). Other publications are: Finding list of history, travel, political science, geography, anthropology (224 pages, octavo, October, 1898), and Descriptive Catalogue of the Gluck Collection of Manuscripts and Autographs in the Buffalo Public Library (149 pages, on handmade paper), July, 1899.

Every year there appears an annual report, the third one for 1899, with 55 pages and a map of the city, on which all delivery stations, also the schools, fire houses, and police stations, to which the library gives books, are designated in red. The last annual report of the Buffalo Library appeared in 1897, as the sixty-first (with 90 pages), and the last annual report of the Young Men's Association, in 1886, as the fiftieth (with 51 pages). The first report of the Buffalo Library counts, therefore, from the fifty-first, while the public library since its establishment in 1897 has numbered its reports from one, and states on the title page that it is at the same time such and such a year of the Buffalo Library. The third was the sixty-fourth year.

Branch libraries are now being established in the city.

With the wise administration which we have described, and the active, constantly increasing patronage of the people on the one hand and the prospective great development of the city and the devotion of its citizens on the other, a much wider sphere of activity and a future rich in blessings may confidently be predicted for the Buffalo Public Library.^a

^a In the State of New York there were, in 1898, 408 public libraries with a ratio of 1,800,000 books to 7,000,000 inhabitants; altogether 983 libraries with 5,400,000 books (Extension Bulletin, No. 27, University of the State of New York, 1899, pp. 48 and 50).

In the State of Massachusetts, in 1899, there were for 3,000,000 inhabitants 344 public libraries with 3,700,000 books, each of which were lent on an average more than twice. During the last fifty years \$8,000,000 in cash have been donated or bequeathed for the buildings and books, besides presents of books and other collections. In 1899 only 7 towns with less than one-half per cent of the total population were without a public library. In 1895 Massachusetts had in all its libraries combined over 7,000,000 books, to the value of \$10,000,000 (9th Report Massachusetts Free Public Library Committee, quoted in *American Review of Reviews*, September, 1899, p. 324).

In the State of New Hampshire public libraries, like public schools, are obligatory.

In the United States, with its 70,000,000 inhabitants, there were, in 1896, 4,026 public libraries, society libraries, and school libraries of over 1,000 volumes each, a total of 38,500,000 books and pamphlets, of which 2 libraries had over half a million books, 4 between 300,000 and 500,000, 28 between 100,000 and 300,000, 69 between 50,000 and 100,000, 115 between 25,000 and 50,000, 411 between 10,000 and 25,000, 630 between 5,000 and 10,000, and 2,727 between 1,000 and 5,000. Of public libraries with over 3,000 volumes there were 627, with a total of 9,000,000 books, which were loaned out for home use on an average three times a year (United States Bureau of Education No. 232, 1897).

IV.—CHICAGO.^a

Chicago, on the shore of Lake Michigan, is the metropolis of the State of Illinois, which, with a population of 4,800,000, ranks as the third largest State in the United States. In 1890 Chicago numbered 1,700,000 inhabitants, a population surpassed by but one city in the entire country. In 1837 the place was still in the midst of a marsh, with only 4,000 residents. In 1871, when the population had grown to 300,000, the city was almost blotted out by fire, so that we might be justified in dating its real foundation from that time.

Its architecture exhibits more evidence of an American national style than is seen in the other great cities of the eastern part of the country. In originality, in youthful vigor, and in the astonishing rapidity of its development Chicago excels all, with the prospect of a yet greater future. The motto "I will" is often found on the allegorical figure of the city, and the words appear to me most suitable to indicate the energetic, aspiring character of its citizens.

9. FIELD COLUMBIAN MUSEUM.

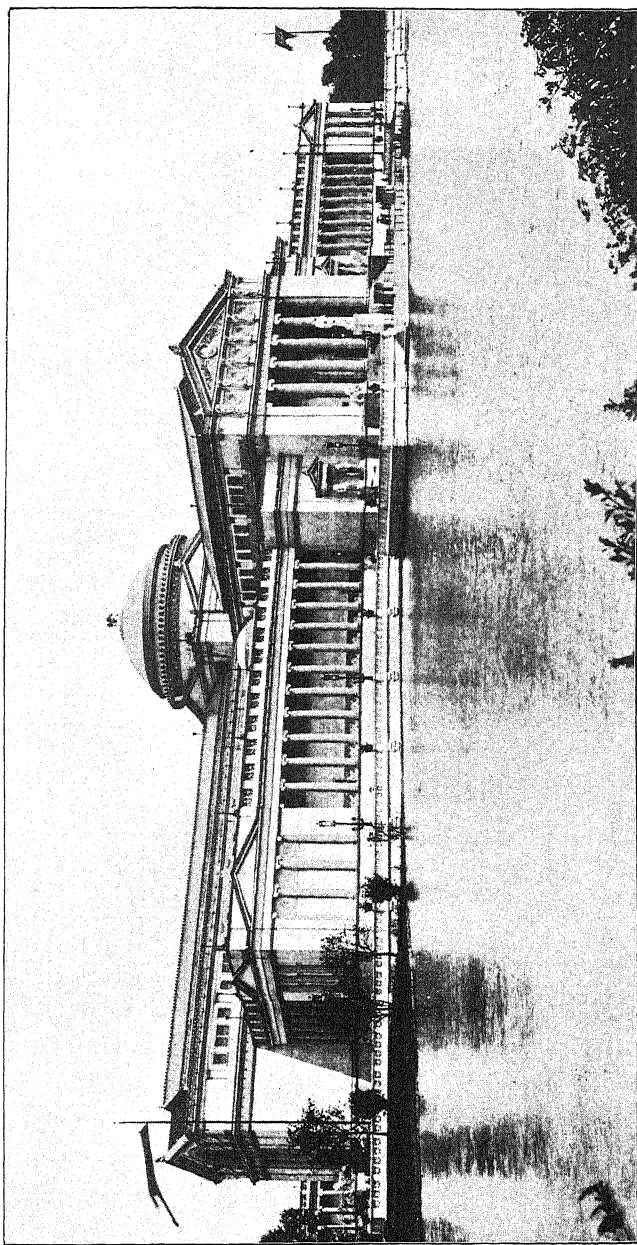
The Field Columbian Museum is a private association, established in August, 1893, during the World's Columbian Exposition, under the name of the "Columbian Museum of Chicago" for "art, archaeology, science, and history."^b In June, 1894, it was rechristened in honor of Mr. Marshall Field, of the immense wholesale and retail establishment of Marshall Field & Co., who, immediately after its foundation, presented to the museum \$1,000,000, on the condition that a sum equal to half that amount should be given by others. This condition was fulfilled within a few weeks by the generosity of some 1,200 persons, who subscribed from \$1 to \$100,000 each. A fund amounting to about \$250,000 from these gifts is invested.

The chiefs of the different departments of the Columbian Exposition, especially those of mining, metallurgy, anthropology (in its widest sense), and transportation, had sought, in accordance with a plan devised as long ago as 1891, to bring together materials for a permanent museum. In this enterprise Prof. F. W. Putnam, now of the Peabody Museum in Cambridge, Massachusetts, was especially active, and at the breaking up of the exposition there was a most favorable opportunity for obtaining all kinds of collections.^c This

^aComprising Part II of *Über Museen des Ostens der Vereinigten Staaten von Amerika*, by Dr. A. B. Meyer.

^bThe corporation was especially founded "for the accumulation and dissemination of knowledge and the preservation and exhibition of objects illustrating art, archaeology, science, and history."

^cFor instance, there were bought, at the close of the exposition, the collections of Paraguay, Peru, Java, and Samoa, as well as those of the dealers in natural history, Hagenbeck, of Hamburg, and Ward, of Rochester, New York, the last costing \$100,000. Large collections were given by Russia, Japan, Corea, Ceylon, Siam, British India, Mexico, Central America, and all the States of South America.



FIELD COLUMBIAN MUSEUM.
South front.

peculiar genesis explains the vast scope of this Chicago institution, perhaps embracing too wide a field, as we shall see, and accounts for the astonishing repletion of its overcrowded cases, as well as for the fact that the museum, in true Chicago style, could, from its very beginning, claim a place among the leading museums of the world, an apparently solitary example in the history of such institutions. There was also the extraordinary advantage of having available among the exposition buildings one of more substantial construction than the rest, the one provided for the exhibit of fine arts. It is a wide-spreading structure in Ionic style of the Spanish type, designed by Charles B. Atwood. It has about 6 acres of ground space available for exposition purposes, or almost double the space of the old market at Dresden, and stands by itself in Jackson Park, an area of 521 acres, immediately on the shore of Lake Michigan, which is nearly as large as the Kingdom of Bavaria. The main front of the building faces north toward the city; the south front (Plate 15) faces a large pond; the east side is toward the lake. Its orientation is of no importance to the collections within as the building is lighted throughout from above. The ground plan (fig. 32) shows two naves, 110 feet wide, 77 high, and 556 and 333 feet long, crossing each other at right angles. To these are adjoined transverse and longitudinal halls. A central rotunda is 140 feet high. There is annexed to the north front on either side, a pavilion 223 feet long by 133 feet wide, divided into separate rooms. The building with its classical style presents an imposing effect from a distance, but on near approach its beauty is marred by the dilapidated aspect of the exterior, for the white covering of the brick wall is here and there damaged and broken away. The simple division of the interior is very favorable for finding one's way in the extensive building. The naves are provided with galleries (fig. 33), but the ordinary character of an exhibition hall, in which most heterogeneous objects are placed near together,^a generally prevails, and there is lacking that intimate charm which can only be afforded by a building designed for its special purpose. Although it would be easy to imagine a better building (the American Museum of Natural History in New York, already described, being incomparably better) yet there are in Europe new museum buildings much inferior to that of the Field Columbian Museum. Its principal faults are defective skylighting in some portions and insecurity from fire because of the large amount of interior woodwork. It is to be hoped that it may continue to be spared the disaster of a conflagration. The extraordinary quantity of mate-

^a For instance, a few steps from the collection of shells there stands furniture belonging to the Danish poet, Hans Christian Andersen, and also stocking and glove machines from Chemnitz dating from 1834. This must somewhat perplex the lay public, irrespective of the fact that the green upholstered sofa with two similar stools, even though it belonged to a celebrated poet, impresses a visitor strangely in a museum of high standard.

ria exhibited in the building, and the contracted space devoted to work rooms and storerooms, has caused such a crowded condition that a new building is already talked of, and indeed it is thought that the museum may be united in one large building with the John Crerar Library, described beyond. This combination would be an excellent plan, and Chicago would thereby be doing an admirable deed.^a With such a condition of affairs and with the rapid development of everything in that country, it is not worth while to give a detailed description of the

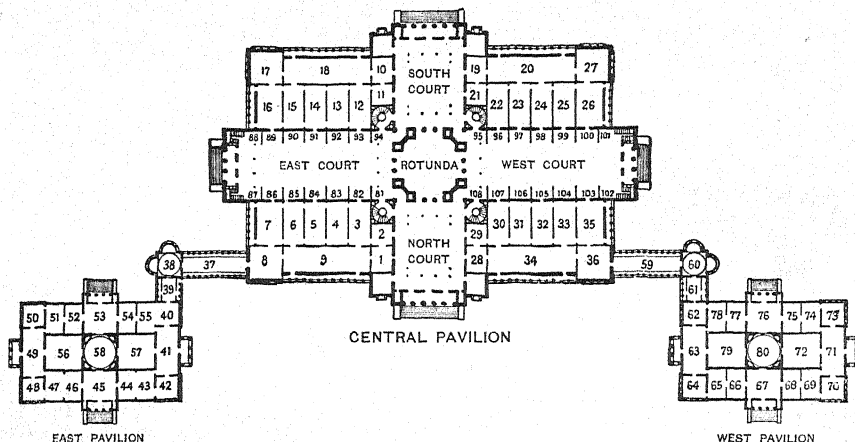


FIG. 32.—Field Columbian Museum. Plan of ground floor.

1, 16-18, American aborigines; 2, Korea; 3, 5, Asia; 4, Oceania; 6, Africa; 7, China; 8, prehistoric Hopi pottery; 9, Egyptian archeology; 10-13, northwest coast of North America; 14, California; 15, southwestern United States; 19-21, mammals; 22, fishes, reptiles; 23, osteology; 24, invertebrate animals; 25, shells; 26, 27, birds; 28, reading room; 29, library; 30, 31, South America; 32, gems and jewels; 33, ceramics; 34, lecture hall; 35, 36, 59, paleontology; 37, 38, marine transportation; 39, human burden bearers; 40, pack animals; 41, 57, Pennsylvania Railroad collection; 42, railroad appliances; 43-53, 56, evolution of the locomotive from 1680 to 1876; 54, street cars; 55, vehicles; 58, models and statuary; 60, 61, geographic geology; 62, meteorites; 63, 64, systematic mineralogy; 65, dynamic geology; 66, lithology; 67, 68, building stones; 69, mineral combustibles; 70, carbon minerals; 71, petroleum; 73, office of department; 75, laboratory; 76, iron and steel metallurgy; 77, clays and sands; 78, salts, asbestos, etc.; 79, ores and metallurgy, base metals; 80, mineral trophies; 81-94, zoology of America; 95-108, zoology; west court and south court, zoology; north court, European archeology; east court, American archeology; rotunda, sculptures in commemoration of Columbus and the exposition.

museum structure. I will therefore speak only of the organization of the fire service, which is unexcelled in careful precautions.

No one is allowed to smoke even in the vicinity of the building, and within it almost no fire is permitted. When, for example, a preparator needs fire for his work, permission must be had from the director and the fire is managed with extreme precautions. All woodwork is coated with fireproof paint. In some instances, cases containing objects,

^a Quite recently (1903) it is understood that Mr. Marshall Field has given \$10,000,000 for a new building on the lake shore in the center of the city. The combination with the John Crerar Library has been given up and the library is erecting a building of its own (1904).

possibly subject to spontaneous combustion, are covered with strong asbestos paper five-eighths of an inch thick, and the neighboring walls are similarly covered to a thickness of an inch and a quarter. The heating plant is placed in a detached building. Three trained men from the city fire department, together with the employees of the building, have charge of the service, day and night, without and within. These three firemen each perform sixteen hours of service during the twenty-four hours, and the entire building is inspected every four hours, the inspection being registered by a service clock of the "American Watchman's Time Detective System," and the record is laid before the director every morning. The doorkeepers and watchmen are drilled twice a month. The greater number of those em-

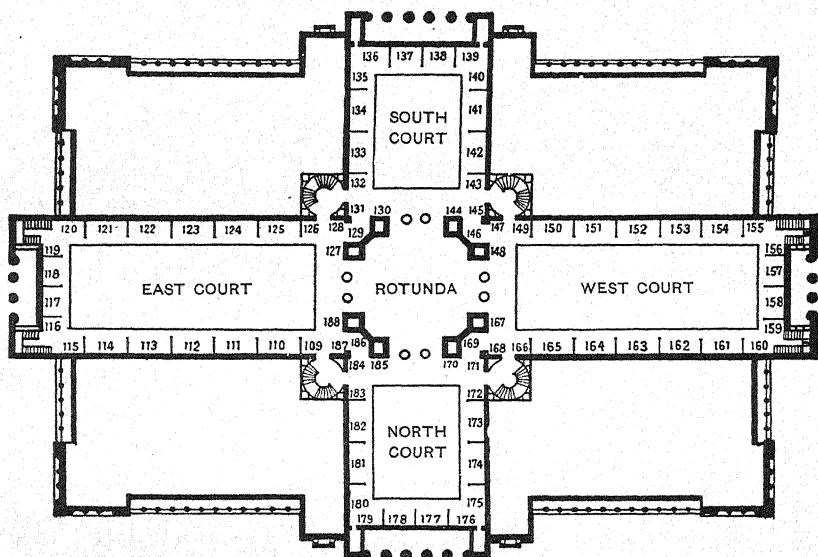


FIG. 33.—Field Columbian Museum. Plan of gallery. 109-188, Botany.

ployed were previously in the service during the exposition, and may be considered as veteran firemen. The electric conduits in the building, which supply 40 arc lamps, are carefully inspected daily and put in order. In each of the four wings of the principal building the following apparatus is distributed: 2,500 feet of hose upon racks and reels, together with a hose carriage; 4 25-foot fire ladders; 7 fire poles of various lengths, with iron points and hooks to break through ceilings or to pull them down; 26 fire axes and 145 fire buckets. There are 8 fire hydrants within the principal building and 12 on the exterior, also 4 hose reels upon the galleries and 1 in each of the two side buildings. There are also provided and distributed 1 large chemical fire extinguisher of 55 gallons capacity, supplied with 300 feet of hose, to reach every portion of the building; 42 chemical hand extin-

guishers, each of 4 gallons capacity, and 148 filled buckets with automatic covers—100 of them on the roof, filled with about 442 gallons of water. There is also available the special high-water pressure system of the park, and definite arrangements are made with the city fire department for such extra service as may be needed. Fourteen fire alarms are distributed throughout the building, which give signals, both in the room of the fire watch and in the distant room of the director. The offices in the upper story are provided with a mercurial automatic fire-alarm system. Upon the roof a series of mercurial thermostats have been placed which, at a temperature of 175° F., give the signal of alarm in the room of the fire watch, so that the situation of the fire is at once known.^a

On account of the isolated location of the museum, everything that ingenuity can devise has been done to diminish the danger from fire, liable on account of the combustible nature of the building and furniture, and to meet accidents that may occur. I have described this system in such detail to show how careful people have become in a city which has burned down within the memory of man. But with us, too, just as much care is desirable, for it is much more important to prevent a fire in museums, or to stop it when first started, than to extinguish it with the aid of the fire department, for the water thrown by engines is as destructive as the fire itself. A proof of this was given in January, 1901, at the fire in the old pathological institute of the Berlin University, in charge of Professor Virchow, where valuable material was destroyed by the water thrown to extinguish the fire.

It impresses a German to find in America that generally no lightning rods are in use—none at all, for example, on this museum. In Saxony there are very stringent police regulations in this regard. On inquiry about this matter in the United States I was told that the electric wires served the same purpose.^b Considering the great dryness which exists in summer, together with the high degree of heat in the United States—I myself, on September 5, 1899, at 5 p. m., endured a temperature of 98° F. in Chicago^c—I believe that in spite of all the careful precautionary regulations, the expensive collections of the Columbian Museum are seriously endangered in this building, and I

^a For security against burglary a watchman in the halls of gems, as well as one at the entrance, must give assurance of his presence by a bell signal every quarter of an hour. There are also electric alarms in the same hall.

^b I much doubt the accuracy of this view, for the protecting effect of lightning rods can not, in many cases, be denied, though nowhere in the United States are they required by police regulations, and what is more to the point, the fire insurance companies do not demand them; while on the other hand, mortgagees frequently demand security of buildings against cyclones.

^c This is blood heat. The highest observed temperature within a short time before was 100° F., on July 16 and 17, 1887. This was first exceeded on July 11, 1901, when it was 102° F.

would congratulate the city should it become able to place this collection in a fireproof structure.

When the museum was established the following seven departments were provided: Anthropology, geology, botany, zoology (exclusive of ornithology), ornithology, industrial arts, with two sections of transportation and railroads, and Columbus memorials. In 1896 there was added to this the department of monographic collections with the two sections, that of printing and graphic arts and musical instruments. In 1897, however, the departments were reduced to five: Anthropology, botany, geology, zoology (exclusive of ornithology), and ornithology. Under anthropology is now embraced everything that was formerly in anthropology, industrial arts, transportation, railroads, Columbus memorials, printing and graphic arts, and musical instruments. That there exists any essential reason for creating a department of ornithology distinct from zoology is not apparent. The anthropological department occupies the entire east wing (1-18, ethnography; 81-94, America), the entire central pavilion (Europe, Asia, Africa, and America and statues in the rotunda), a portion of the west wing (30-33 industrial arts), and the entire east portion (transportation). The botanical department occupies all the galleries (fig. 33); the geological department the entire west pavilion and two halls of the western wing (35-36); and the zoological, including the ornithological department, the greater portion, or two-thirds, of the west wing (19-27, 95-108). The installation is mentioned somewhat more in detail in the legend to fig. 32.

The administrative organization is as follows: A board of 15 trustees, 6 of whom constitute a quorum, is divided into four committees, executive, finance, building, and audit. To this board are subject the salaried officials of the museum, at whose head stands the director who, up to this time, has not been a trained scientific man. Each section has a curator. Besides this, the anthropological and zoological sections have each an assistant curator, and the geological two assistant curators. The assistant of the anthropological section has special charge of ethnology. One of the geological assistants has charge of paleontology. There are altogether nine professionally trained employees, a number entirely insufficient for this large museum. Finally, there is a librarian, a recorder, and 79 subordinates, including 2 collectors, 1 osteologist, 3 taxidermists, 20 preparators, writers, stenographers, etc., 2 modelers, 1 inspector of buildings, 4 engineers, 6 cabinetmakers, 4 painters, 12 doorkeepers, 5 laborers, 16 attendants, and 3 fire guards.

The force is employed from 8.30 a. m., in some cases from 7 or 8, until 5 p. m. or till 5.30 p. m. in June, July, and August, with an hour for luncheon. The hours of labor in American museums are usually longer than in those of Europe.

The "Corporation of the Field Columbian Museum" has also the following members:

1. Corporate members, at present 65, who pay \$20 entrance fee and \$5 annually.
2. Patrons, now numbering 5, who have rendered some special service to the museum.
3. Honorary members, at present 4, who have distinguished themselves in science, art, or mechanics.
4. Life members, now 81, who have contributed \$500 at one time.
5. Annual members, now 415, who pay \$10 a year.^a

The expenses of the museum from October 1, 1898, to September 30, 1899, were, approximately, \$129,000,^b divided as follows: Salaries, \$63,570; heating and lighting, \$8,102; repairs and alterations, \$10,560; furniture and fixtures, \$17,485; books, binding, etc., \$734;^c collections, etc., purchased, \$14,703; installation expenses, \$3,792; publications, \$1,683; general expenses, \$5,460; fire protection, \$2,836.

The receipts were as follows:

From South Park commissioners	\$15,000
Interest on investments, etc.....	21,589
Gifts	6,750
Members' dues.....	3,830
Checkroom fees (5 cents each)	1,082
Admissions (25 cents each)	5,192
Sale of guide books.....	358
Cash on hand at beginning of year	5,185
Securities sold	71,625

In 1899-1900 the total receipts were \$125,052, of which \$85,000 was obtained from the sale of securities. The interest on investments had dropped from \$21,589 in the previous year to \$8,034.

The rich merchants of Chicago would do well to so endow the Field Columbian Museum that it would not be necessary to encroach upon its capital for its ordinary running expenses, but if not the city fathers will certainly undertake this duty. I do not in any case doubt, however, but that the finances of the museum will be put on a sound basis through the generosity of Chicago millionaires.

The museum is open to the public from 9 a. m. to 4, or until 6 p. m. in June, July, and August. On Saturdays and Sundays admission is

^aOnly 415 members in the city having a population of 1,700,000, while the museum of the Brooklyn Institute of Arts and Sciences has, as already mentioned, 6,000 members paying \$5 each, in a population of 1,250,000, and the American Museum of Natural History in New York, with a population of 2,200,000, has 752 members paying \$10 each.

^bThis is more than the yearly expenses for the entire 11 royal collections for arts and sciences in Dresden. In 1899-1900 the expenditures of the Columbian Museum reached \$120,861.

^cThis is proportionately but very little, but 2,348 books or periodicals were received in exchange for museum publications.

free; on other days there is a charge of 25 cents for adults and for children 10 cents. The pupils of the elementary and secondary public schools always have free admission. Umbrellas and walking sticks must be left at the entrance and a fee of 5 cents is charged for checking. The annual average attendance for the past five years has been 250,000. In 1898-99 the number of visitors was 223,304; in 1899-1900, 266,899;^a 21,447 and 28,110 of whom paid admission fees, and on the pay days there were also admitted free 9,714 and 15,216 during those years. On Saturdays there came 54,490 and 56,717, and on Sundays 137,653 and 166,856. The highest numbers on any single day were 6,709 and 6,839; and the minimum, in 1898-99, was 5. I am convinced that the number of visitors would be much greater if the museum were more accessible. From the central portion of the city, it takes an hour and a half by carriage, or half an hour by the electric or elevated roads, to reach the vicinity; or by rapid-transit road, running along the lake shore, ten minutes. For most visitors, however, it means a day's trip, for the city of Chicago covers 187 square miles.^b Surely the number of museum visitors would also be increased if the entrance fee was abandoned. In 1898-99 the fees amounted to not more than one-twentieth of the entire budget, the average attendance on the 260 pay days being only 82 persons, while in 1899 and 1900 this average was 108 visitors for whom the entire apparatus of surveillance must be put in operation and the entire collection be submitted to the injurious influence of light. Thus it happens that a greater number of persons annually visit the incomparably smaller museum of the Academy of Sciences in Lincoln Park (see below), which allows free admission and is centrally located. In 1897 a patron of the museum endeavored to make it useful also for public instruction, and to excite the interest of youth, by offering forty prizes of from \$5 to \$50, amounting in all to about \$300, to the pupils in the public schools of Illinois, for the best essay of 2,000 to 3,000 words, made without assistance, describing the museum or single portions of it. The result was "very satisfactory" and the attendance to the museum naturally increased.^c

^a The American Museum of Natural History in New York was visited in 1899 by 458,451 persons; in 1900 by 523,522 persons. (See also p. 330.)

^b It has three streets that are each 25 miles long, or as far as from Dresden to Schandau. Berlin covers 36 square miles. From this, considering the approximately equal population—1,700,000—an idea can be obtained of the scattered arrangement of the greater part of Chicago. Dresden covers 18 square miles for a population of 500,000.

^c See Publication No. 24, Report series, I, No. 3, p. 197 for 1897. Details of the results have not been published. There were about 70 essays handed in. The Carnegie Museum in Pittsburg, Pennsylvania, a new and very active institution, for which a great future is in store, has, since 1896, offered annually a prize competition, and has reported upon it in several publications which are of unusual interest, the last time in Publication No. 6 of the museum entitled "Prize essay contest, 1899, 32 pages, with 5

In March, April, October, and November, lectures are given on Saturdays, usually by foreign men of science, but also by the museum employees, for the most part illustrated by projections, for which purpose, in 1899-1900, 2,022 lantern slides were provided in the museum collections. Some of the employees of the museum, as the curators for botany, geology, and zoology, are at the same time teachers in the University of Chicago.

The publications, undertaken on a large scale, were begun in 1894. There are six series, the volumes being issued in parts or pamphlets: The annual reports, and series on anthropology, botany, geology, zoology, and ornithology. Up to the end of September, 1900, 8 volumes, comprising 50 single treatises, were almost completed, the greater part being zoological material. The museum also published in 1899 a quarto work of about 400 pages on the birds of eastern North America, by Charles B. Cory, with many hundreds of illustrations.

plates." It was open only to pupils of the secondary schools and the two sections (fourteenth and thirteenth grades) of the uppermost class of the Pittsburg grammar schools. The prizes were especially assigned for each class; 1 each for the fourth, third, second, and first year of the secondary schools and 1 each for the fourteenth and thirteenth grades of the grammar schools. (I refer to my remarks upon the American schools in the chapter on The University of Chicago.) There were awarded in 1899 thirty-eight prizes, ranging in value from \$2 to \$25, having a total value of about \$250. The subject was "What I learned from five objects in the Carnegie Museum." The essay must not exceed 1,200 words, and 3½ weeks' time was allowed for writing it. The pupils were advised to obtain information about the museum from their parents and friends; they could also use books, and the teachers were specially directed to further the matter, but it was a point of honor that in the composition of the essay itself no help should be received. There were 401 essays handed in, of which 245 were by girls, who also, with but one exception, won the first prizes. The prize winners were from 12 to 21 years of age. The Indian groups were selected 173 times; the flamingos 120 times, the mummies 121 times, the camel group 86 times, the mastodon 64 times, etc. In all 220 different objects or groups of objects were treated. The boys inclined to choose themes which treated of war, sport, or business activity; the girls, those having historical significance and birds. In the above-cited publication the names of the competitors were published as well as the essay which won the first prize. This was by a young girl 18 years old, and was entitled "Fragments of Creation." She had treated of the following five subjects: The human skull, arm, and hand in the animal series, the gar pike, the Rosetta stone, and the meteorites. The introduction and conclusion as well as the transitions between the different parts were conceived in a religious spirit. In 1900 there were obtained for a similar prize competition 843 essays. (See W. J. Holland, *The Carnegie Museum*, in the *Popular Science Monthly*, LIX, 1901, p. 19.) Pittsburg had, in 1899, among 321,616 inhabitants, 46,266 school children, of which 1,823 were in the three secondary schools. As these essays came chiefly from the secondary schools their proportion to the 1,823 pupils was something enormous. In the three secondary schools there were 23 male teachers and 41 female teachers. In the 79 elementary schools there were 27 male teachers and 878 female teachers. The schools cost the city in 1899 \$875,000. (Report concerning the public schools for 1897 to 1900, Pittsburg, 1900, 123 pages, with tables.) [These prize-essay contests were also continued in 1901 and 1902 with great success.]

A Guide appeared in 1900, in its sixth edition, 176 pages, with many plans; it could be made more useful to the visitor by indexes. From the sixth annual report, forming a volume of 512 pages, with 54 plates, together with the Guide and a little pamphlet entitled *An Historical and Descriptive Account of the Field Columbian Museum*, 90 pages, with illustrations and plans, a good idea can be obtained of the origin and condition of this great museum.

The library contains 24,000 volumes, and is excellently catalogued upon cards alphabetically and systematically arranged according to Dewey's system somewhat modified (see p. 399 of this paper). There is even a topical catalogue of the most important papers in scientific journals and in the publications of scientific societies—an unusual but very useful thing. The library also has a duplicate card catalogue of the John Crerar Library (see p. 451), with 23,000 titles, arranged alphabetically with its own cards—an excellent plan for the scientific worker in Chicago.

The catalogues of the collection are kept in the most scrupulous, careful, and exemplary order, for which purpose extra clerks are required. In the archives are preserved all the original documents of the collections, which are each provided with a permanent number, and receipts are always taken when these documents are delivered to one of the department employees. Besides, the registers are kept in books and on cards. Up to October, 1900, there were 94 volumes of the catalogue, with 215,000 entries, as well as 75,000 cards.^a

The method of cataloguing, to which I paid especial attention in the anthropological department, is as follows:^b Every newly acquired collection, immediately upon its arrival, is assigned a number and given an accession card. This card bears, in addition to a serial number, the name of the collector, the manner of acquisition of the collection by the museum, the place and date of the collection, the numbers assigned to the specimens, and a general statement of the nature of the collection. This card, together with any lists or correspondence that relate to the collection, is deposited in a stout envelope made for the purpose, which also bears the name of the accession. This envelope forms part of the historical file of the department. Both accession card and envelope, together with all correspondence, are made out in duplicate, one set being retained in the office of the curator, the other being sent to the recorder's office. Each object in the collection is then numbered to correspond with the number on a card which bears the name of the object, with a drawing of the same if deemed necessary, the tribe or locality whence the specimen came, the name of the collector,

^a See the *American Anthropologist*, n. s., I, 1899, p. 473.

^b In America everything, as one may say, is registered upon cardboard of definite size, and the catalogues are therefore called "card catalogues." This "card catalogue system" is exceedingly practical.

and, finally, the location of the specimen in the museum—whether it be on exhibition, and, if so, where, or whether it has been placed in the temporary or exchange storage room. The information contained on the cards is next transferred to the department inventory books under the appropriate numbers. Each card, as well as each entry in the inventory, also bears the accession number. The cards are then collectively filed in a card cabinet under the accession number, each group of cards being provided with an index card. The collection is finally indexed in a single large volume under the name of the collector, the locality, and the tribe. The advantages of this system are many and obvious. It can be determined at a glance what collections are in possession of the department from any locality or tribe in the world, as well as ascertained what collections the department may possess from any individual, as collector or donor or through purchase. From the accession number under any of these entries one can refer to the historical file for the lists or for the correspondence; or with the same accession number he may turn to the inventory book or to the card catalogue for a description or for the exact location of the specimens themselves. On the other hand, from the number of any given specimen, reference may be made at once to the inventory book for its locality or tribe; or, from the accession number there given, the correspondence in the historical file relating to the collection as a whole may be consulted. The method of cataloguing used in the botanical department is also very complete in its way; it is described in the Annual Report for 1899-1900, pages 440-442.

In such a complicated system there is naturally much clerical work necessary, but the expense of this is more than repaid by the saving of time which the excellent arrangement occasions. One can with the greatest ease obtain information concerning anything, and on the basis of its documents prepare exchange catalogues, of which already several extensive ones have appeared. In 1899-1900 the increase was 64,921 numbers in 286 entries; in 1898-99, 17,348 in 305; in 1897-98, 74,200 in 362.

The officials undertake many extensive collecting tours, the expenses of which are usually defrayed by patrons of the museum. When I was there in September, 1899, I met only a few of the museum staff. The curator of the zoological department was on the Pacific Ocean; that of the ornithological department, with his assistants and a preparator, were in Honolulu; the curator of the botanical department had that year made a voyage to the West Indies; the assistant curator of the zoological department had, among other collecting tours, made one to the Pacific coast; the curator of the anthropological department had made a tour to northwest America and other regions; and the assistant curator of paleontology had made explorations in Wyoming. In the year 1896 the curator of the zoological department had under-

taken a journey to Africa for the purpose of collecting specimens for the museum.

The labeling of the collection is carried on with the greatest energy, and everywhere one gets the impression of a museum well provided with descriptive and instructive labels, particularly well printed. The tendency to instruct the public in this respect is, in America generally, more marked than with us. The printing establishment of the museum prepared in 1898-99 over 7,000 labels, some very large, 3,500 of them for the anthropological department, and furnished also 95,000 other pieces of printed matter. In 1899-1900 nearly 8,000 labels were printed in the museum, 2,700 of which were for the zoological department, and there were also furnished 100,000 copies of other printed matter.

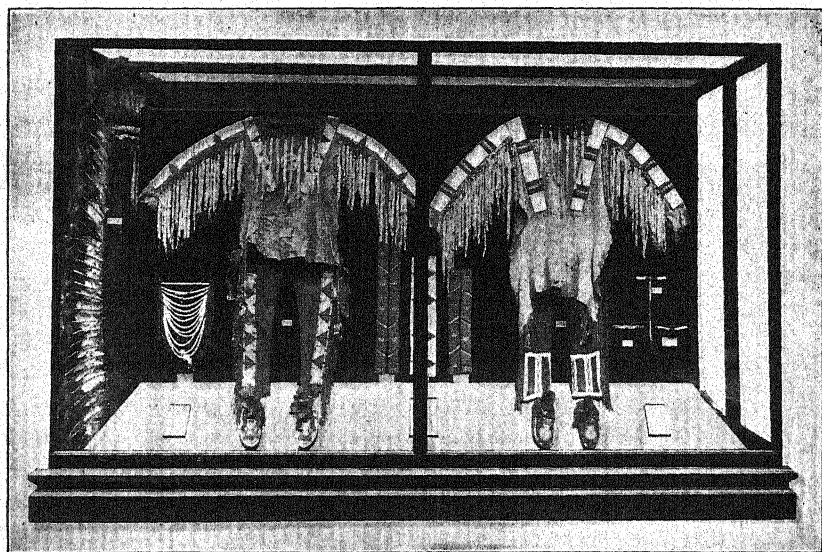


FIG. 34.—Field Columbian Museum. Case with movable partition.

The photographic establishment of the museum in 1898-99 prepared 548 negatives, 280 prints, 253 lantern slides, and other material; in 1899-1900 the corresponding figures were 1,148, 1,075, and 343.

The arrangement and installation of the entire museum gives, in general, a pleasing impression, especially in the geological and botanical departments, which offer many models, notwithstanding that in particular cases the methods and kinds of installation do not always come up to strict requirements. It should be remembered, however, that the whole work has been accomplished within a few years, and that some appliances already existing had to be accepted. There are, for instance, remaining from the exposition of 1893 many cases and desks with clumsy wooden frames and sides; but neither does the

recently procured furniture meet the rigorous requirements of to-day, notwithstanding pains have been taken to invent some new types of cases. In the ethnological section, for example, are seen large glass cases with wooden frames and clumsy supports, entirely destitute of doors, the sides being made of plate and the top of ground glass. One of the narrow sides of the frame can be unscrewed. The objects are now hung either directly or by supports on both sides of a movable partition provided with a foot piece, which is then shoved into the case. As these partitions are frequently not as high as the case itself, they do not look well. They can also be used as backs by shoving them in along the side (fig. 34).

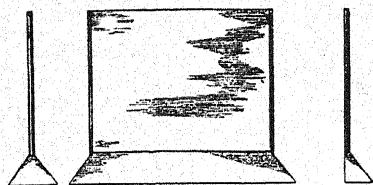
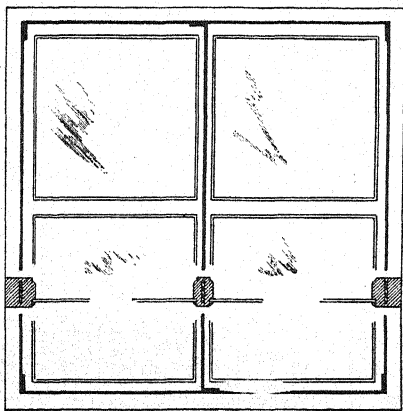


FIG. 35.—Field Columbian Museum. Top and partition of case shown in fig. 34.

If an object must be changed, or is required for study, the great frame must be unscrewed with the aid of several persons. As a similar but much more elegant and entirely dust-proof case with iron framework and doors can now be furnished, the principle of the screwed frame that prevailed fifty or one hundred years ago can not be recommended.^a I also give an illustration of the construction of the case top, with its disproportionately heavy woodwork in which, for stiffening, there is riveted an inset of wrought iron, half an inch thick and 4 inches wide, together with an illustration of the wooden partition (fig. 35). This partition is 11 feet long, 1½ inches thick, 5 feet high; its foot piece is 12 feet long, 1 foot 6 inches wide, 1 foot high.

The glass cases for the many large and often very remarkable and beautifully displayed zoological and ethnographical groups also have no doors, but nevertheless they have similar clumsy framework and bases. In the horizontal show cases the base has, indeed, the appearance of a closet, but the space is hollow and unused. Other types of glass cases in use in this museum are shown in figs. 36–37; fig. 36 is a neat style; the supports are of gas pipe of from three-eighths to a half inch in diameter, but the small panels of the top injure it; fig. 37 shows hanging shelves. Style fig. 38 is the hollow base and the inner

^a If this is compared with what the curator of this department says concerning the cases in European museums (G. A. Dorsey, *American Anthropologist*, n. s., I, 1899, p. 471), one can only exclaim: *De gustibus non est disputandum!*

arrangement of a case or stand inclosed by glass doors and especially constructed for lighting from above; it is about 9 feet long, 1 foot broad, and 7 feet high, its base being 2 feet high; the woodwork is clumsy and the arrangement of the shelf supports, with four standards, is obstructive. Similar stands are used throughout the museum and do not generally add to its beauty; when, however, the exhibits do not need to be inspected on all sides, these stands are arranged as a four-sided well-lighted pyramid that excellently answers the purpose for which it is constructed. The new cases are of mahogany or of other wood polished black. In showing the collection of skeletons, black backgrounds are often employed, as in several European museums, but the setting of the skeletons contrasts disagreeably with this black background and their mounting is sometimes rude.

While some of the great mammal and bird groups are displayed in a strikingly beautiful manner, there were many of inferior character, for example, in the ornithological department, although the museum is developing so rapidly that perhaps even these may now have given place to better ones.

In the botanical department there were found very practical herbarium cases which showed a good utilization of space (fig. 39). They are nearly 7 feet high, 3 feet 4 inches wide, and have each

45 compartments, 5 inches high, and 3 sliding shelves. They stand in pairs, back to back, with sufficient intervening space for the doors to be pushed back out of the way. The doors slide on tracks, which also hold each pair of cases rigidly together. The door is hinged at *gg*, hung to the wing piece (*EE*), which slides to and fro with it on the track, and during this movement the door is always supported by a noiseless castor which is screwed into a block of hard wood, *h*, that serves as a check to the door when pushed back and as a foot press when locking it after closing. The door is opened as widely as the wing piece will allow and then shoved back. In closing, one pulls the key of the lock, the door is run along the track as far as the rolling pins *dd* permit,

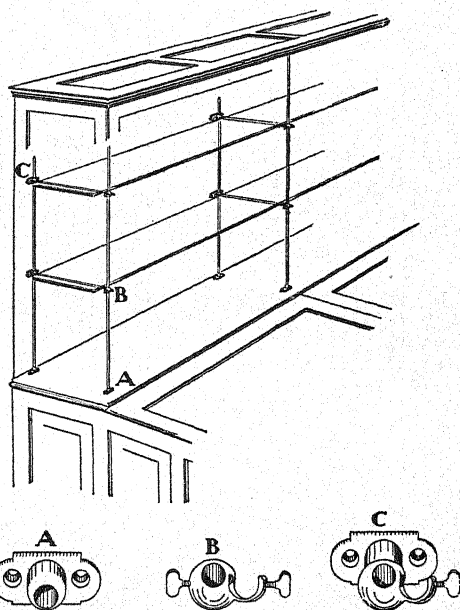


FIG. 36.—Field Columbian Museum. Types of cases and racks.

and then swung shut. These cases offer many advantages and are ingeniously designed, but they should be made of iron instead of wood, for they would then be more secure against dust and fire. (See also Report for 1899 and 1900, p. 450, Plate XLVI.) This remark will apply likewise to the wooden cases of the entire museum. In this connection may be mentioned the pasteboard boxes still used, instead of tin, for the display of minerals and the like. I do not doubt but that the Field Columbian Museum will in time have recourse to iron cases, be it only as a security from fire, and that then excellent designs will be brought forth by the advanced technical skill of America.^a Better cases are also to be desired on account of security against dust, for in the great halls of this palace, designed for a former exposition and

all communicating with each other, the dust spreads unimpeded over everything and is very troublesome.

A collection of coins is suspended between glass plates—a very pretty method, but somewhat clumsily executed here.

The overcrowding of the exhibition space already mentioned is occasioned partly by the fact that far too much is exhibited. Objects must often be displayed because the donors demand it, and the result is that there are frequently

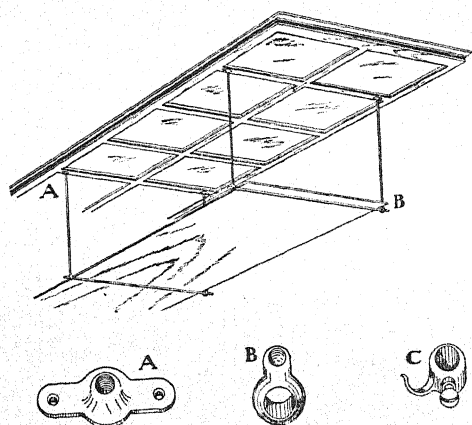


FIG. 37.—Field Columbian Museum. Types of cases and racks.

hundreds of almost identical specimens, as in the ethnographic division, which are valuable for study but quite superfluous in a public collection, the more so as light fades them. Besides, by reducing the number of exhibits space could be found for work-rooms, now quite insufficient throughout. There have been provided, as in the American Museum of Natural History in New York (see page 333 of the earlier portion of this paper), very practical, tight-closing tin boxes, with easily sliding compartments, for the preservation of

^a From the criticism made by L. P. Gratacap in his article, *The Making of a Museum*, in the *Architectural Record*, IX, 1900, p. 393, on iron cases, both upright and horizontal, as "clumsy and ugly forms" (fig. 17), which are the only ones with which he is acquainted, one would not think the prospect of such a reform in America was very favorable. The honored curator of the mineralogical section of the American Museum of Natural History in New York, who has an interest in and knowledge of the technical side of museum administration possessed by few experts, would certainly change his view if he became aware of the better results in this line in Europe.

skins, plants, etc., 30 inches long, 20 inches high, and 18 inches deep, made by the American Can Company, Bowling Green Building, New York and Chicago, and costing \$10. These are also made in various other dimensions. They often stand piled in the workrooms to the very ceiling.

In conclusion I will hastily sketch the museum collection, though from its great profusion I can give the reader but a feeble idea of its exhibits. I must limit myself to enumerating a few principal objects.

Anthropological department.—The archeology and ethnology of North America stand in the foreground. Among the most interesting, archeologically, is the collection of the Hopewell Mound group in Ohio, with a large series of copper, stone, and bone ornaments and implements, among which is a deposit of 8,000 stone implements. Well represented in a prehistoric way are Illinois, Arkansas, Wisconsin, Michigan, New Jersey, Tennessee, California, New Mexico, and Arizona. There is also a large collection of casts from the sculptures of Yucatan.

In the ethnological field there are very complete representations of the Kwakiutl and Bellacoola of the northwest coast, the Kulanapan of California, the Hopi of the Southwest, the Sioux and Algonkins of the Plains. I further mention houses, totem poles, and the other ethnographical equipment of the Haidas of Alaska, Eskimo materials from North Greenland, Alaska, and Eastern Siberia, group exhibits of the villages, houses, and industrial occupations of the Zuñi, Hopi,^a etc., with life-size figures. One of the seven Hopi villages, Oraibi, in Arizona, is—so to speak—here reproduced complete, so as fully to show the interior and household life of the Indian of to-day. To this is added a collection of over 4,000 pieces of prehistoric pottery from the near-by Hopi ruins. Further, there are exact imitations of nine altars and sand mosaics as they are used in ceremonials of the Hopi, whose religious life is especially well represented.

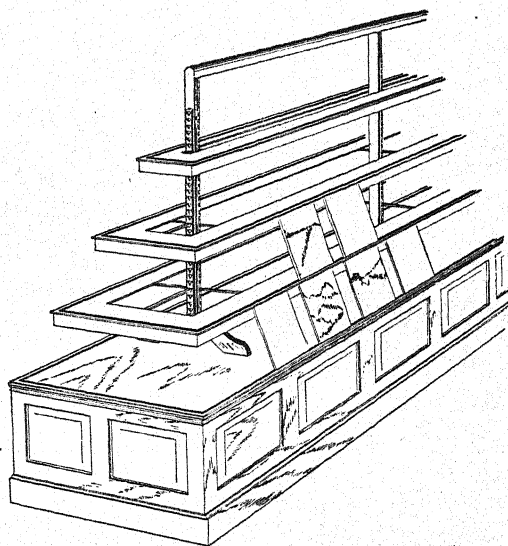


FIG. 38.—Field Columbian Museum. Types of cases and racks.

^aSee also the detailed description of these Hopi collections in *Science*, n. s., XIII, 1901, pp. 219-222.

The ethnology of South America is illustrated by extensive collections from Colombia, Venezuela, British Guiana, and the region of the Gran Chaco; the prehistoric, by similar ones from Colombia, Ecuador, Peru, and Chile. Melanesia is the best represented in the South Sea division. Asia is at present represented from its eastern coast alone; the Korea collection is especially good; Java and Ceylon also offer some very notable objects used for theatrical and dramatic performances. Africa is represented only by special regions, such as the Congo basin and Portuguese Southwest Africa.^a In European archeology there are shown many reproductions of the bronzes in the

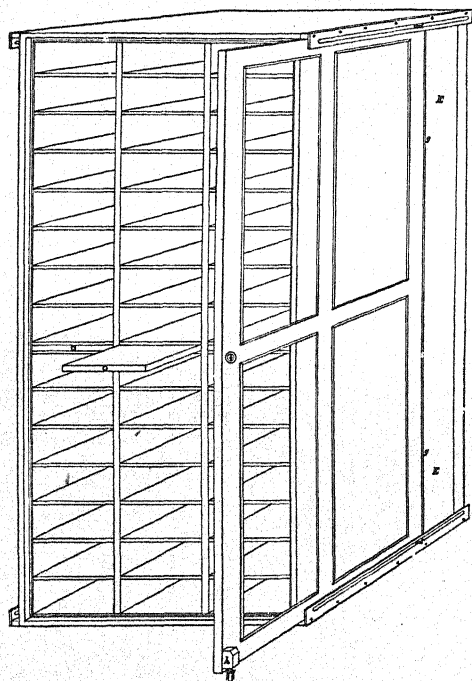


FIG. 39.—Field Columbian Museum. Herbarium case.

Naples Museum, as well as bronzes and wall decorations from Boscoreale and Grecian, Roman, Etruscan, and Phœnician originals. About a thousand objects from the Swiss lake dwellings are shown, and some also from prehistoric England. I can not, however, begin to enumerate all.

The section of transportation is given a prominent place, and one may say that no age and no land has been disregarded. It begins by showing how primitive peoples carry their children and their goods, shows all sorts of litters, pack animals, and other beasts of burden, carriages with solid and spoke wheels, and at last illustrates the entire

development of the locomotive. It is impossible to touch upon every thing in a limited space. The peoples of America from Alaska to Brazil are especially well represented. So, also, the development of railway travel, shown with great completeness, is of historic interest. Serial cards indicate how the railways of America have increased every ten years. The water and wagon transportation is also shown in just as complete a manner. One may see a "Scythian" cart

^aSee also P. Ehrenreich's detailed description of this portion of the Museum in the *Zeitschrift für Ethnologie*, 1900, pp. 18-23, and G. A. Dorsey's paper, the Department of Anthropology of the Field Columbian Museum—a Review of Six Years, *American Anthropologist*, n. s., II, 1900, pp. 247-265.

(replica), a Nile boat of the fifth century B. C., an Etruscan boat as a child's plaything (replica), the caravels of Columbus, and a Viking's ship.

The physico-anthropological collection is very notable, and is among the best in the world. It must be the richest in human skeletons, although only in American ones. I did not get the exact number of skulls and skeletons, but there must be several thousand. Many hundreds of skulls and skeletons are from the tribes of the northwest coast, the Blackfoot, Algonkin, and allied Indians, from the mounds in Ohio and the prehistoric graves in New Jersey. The Flatheads of the Columbia River are represented by a series of complete skeletons, with 100 artificially deformed skulls; Peru with over 150 complete skeletons and many skulls. There are also 90 skulls from New Guinea, some Maoris, and a small series from many regions of the earth. An instructive exhibition is made in 33 cases of selected pieces from the large collection. There is one case devoted to each of the following: Craniometric nomenclature, sexual variation in the skeleton, variation in the cranial sutures; varieties at the glabella, pterion, and in the orbits; variation in the nasal region and degrees of prognathism; variations in the intermaxillary suture, mastoid process, shape of palate, and direction of palatine sutures; variations in the lower jaw, lachrymal bones, and occipital condyles, the clavicle and scapula, the dentition, the sternum and bones of the pelvis, the humerus and the tibia, the femur; skulls of different capacity and various cephalic indices; skulls showing variations in the orbital, nasal, and dental indices; in the facial, palatal, and bizygo-stephanic indices; variations in the scapula, lumbar, sacral, and pelvic indices; pathological skulls, artificially deformed skulls, trephined skulls from Peru. Six cases are devoted to disarticulated skeletons showing pathological or anomalous characters; one to models of the brain; one to casts of cranial cavities, including those of animals; two to skeletons of gorillas and men of various races; two to the chemical constituents of the human body; one to life masks of the races of eastern Asia and of Oceania. There is added to this an anthropometric laboratory, with the needful instruments. This department was specially organized by Dr. Franz Boas, a German, now at the American Museum, in New York, and professor in Columbia University. I have described the physico-anthropological collection with more relative fullness because a similar one can hardly be found elsewhere, and it may perhaps lead to imitations. The present competent curator of this department, after a visit to European museums, expressed the opinion that as to the exhibit of physical anthropology none of them could compare with the Field Columbian Museum in Chicago," wherein I agree with him.

^a G. A. Dorsey: *American Anthropologist*, n. s., I, 1899, p. 463.

Botanical department.—There was obtained from the World's Fair, beautifully installed both in geographic sequence and in a monographic manner, an unusually extensive collection of woods, forest products, such as fruits, resins and the like, fibers, and other economical plant products, in a profusion that is, perhaps, without a parallel. Especial attention is given to products having a domestic and practical value, such as cotton, tobacco, hemp, grains, tea, coffee, spices, dye-stuffs, etc. Forestry is illustrated by monographic exhibits. From one and the same tree there are shown blocks, leaf-bearing branches, and flowers; photographs of the species at various ages; pieces of its bark, cross sections of the stem, planks in various stages of working up to a polished condition; besides a colored chart of the geographic distribution of the species, statistical data concerning its weight, hardness, density, and heating value, so that any one, from his own standpoint, may obtain information and instruction. In this way "Latin" America is especially well represented, and there are economical botanical products from Russia, Japan, Korea, Ceylon, British India, Johore, North America, Mexico, Guatemala, Jamaica, British Guiana, Venezuela, Colombia, Ecuador, Brazil, Paraguay, and the Argentine Republic. Recently there has been installed a complete collection of the timber trees of North America. The herbarium contained, in October, 1900, about 80,000 plants, and is, like the whole vast department, especially well organized. Particular attention is paid to American plants, and the collection is rich in North American and West Indian species.

Geological department.—The collections are arranged in two series—one systematic, the other economic. The systematic is divided, as is usual, into paleontological, mineralogical, lithological, structural and dynamical sections. The paleontological section is chronologically, and within each period zoologically arranged. Much attention is given to the collecting of fossil vertebrates of the western United States, a region specially rich in this regard. I will name, as an example, the material obtained in South Dakota in 1898 relating to *Titanotherium ingens* Marsh, a mammal resembling a rhinoceros and nearly 16 feet long, and the extensive material collected in 1899 in Wyoming relating to land reptiles (dinosaurs) known as *Brontosaurus*, *Creosaurus*, *Camptosaurus*, *Morosaurus*, etc., the last named having a femur over 5 feet long.^a The mineralogical section is arranged according to Dana. In the section of structural and dynamical geology there are shown, among other things, cave products (stalactites, stalagmites, and the like), in a great cave naturally arranged. The economic series illustrates the occurrence of minerals and ores which have economic importance, the processes by which they are extracted, and their application in the

^a Recently there have come to the Columbian Museum dinosaur remains of yet larger animals, among which is a femur over 6 feet 6 inches in length. (See E. S. Riggs, in *Science*, April 5, 1901, p. 549.)

arts and industries. These economic collections are arranged in systematic series with geographic subdivisions. Because of the profusion of this material I can only mention a small part: Comprehensive exhibits of combustible minerals of the United States according to their occurrence, their composition, their economic value, etc.; the building and ornamental stones of the United States; the kinds of marble and such like, also those of many European countries (in cases like fig. 38); the metallurgy of the precious and base metals, the metallurgical process being represented by groups, in which pieces of the ore, the smelted product, and the combustible materials used are displayed with the help of labels and converging and diverging lines showing what materials go into the furnace and the resulting products, with all the intermediate stages; their composition, peculiarities, uses, etc., are given in printed descriptions, so that anyone seeking information can get all the necessary data at once. A striking collection of precious and decorative stones, and a collection of meteorites which fills an entire room, are conspicuous.

The vast and copious collection of this department is remarkable for its instructive and often elegant installation. I would have been glad to include illustrations of entire rooms like those shown in the annual reports of the museum. I should certainly not neglect to mention the model of the moon, 18 feet in diameter.

Zoological and ornithological department.—The most striking feature of this department is, first of all, the excellent representation in large glass cases of groups of animals, such as orang-outangs, chimpanzees, nose apes, musk oxen, black sheep from Alaska, gazelles, antelopes, leopards, hyenas, herons, etc. Sometimes the secondary work of artificial foliage and the like is somewhat obtrusive, but these groups excellently fulfill their object of attracting the general public, though they also require much space. The systematic collection has not yet received the same consideration, for the proper preparation and installation of a large series of animals can not be accomplished in a short time. The skeletons stand in a room adjacent to the systematic collection. About 10,000 species of shells are shown in horizontal cases of not especially pleasing construction.

The Field Columbian Museum would do well to somewhat contract its programme and lop off several branches which have led it too far in its attempt to embrace all possible lines of human interest, so that it may devote itself in a scientific way to the natural sciences and to ethnography still more than it does now. There is still clinging to it too much unimportant material from the World's Fair, but one can only look with real admiration at this museum, which has sprung out of the earth in so short a time. If it secures, as is expected, a new building, I do not doubt but that it will astonish the world by its ability and compete with the first museums for precedence.

10. CHICAGO ACADEMY OF SCIENCES.

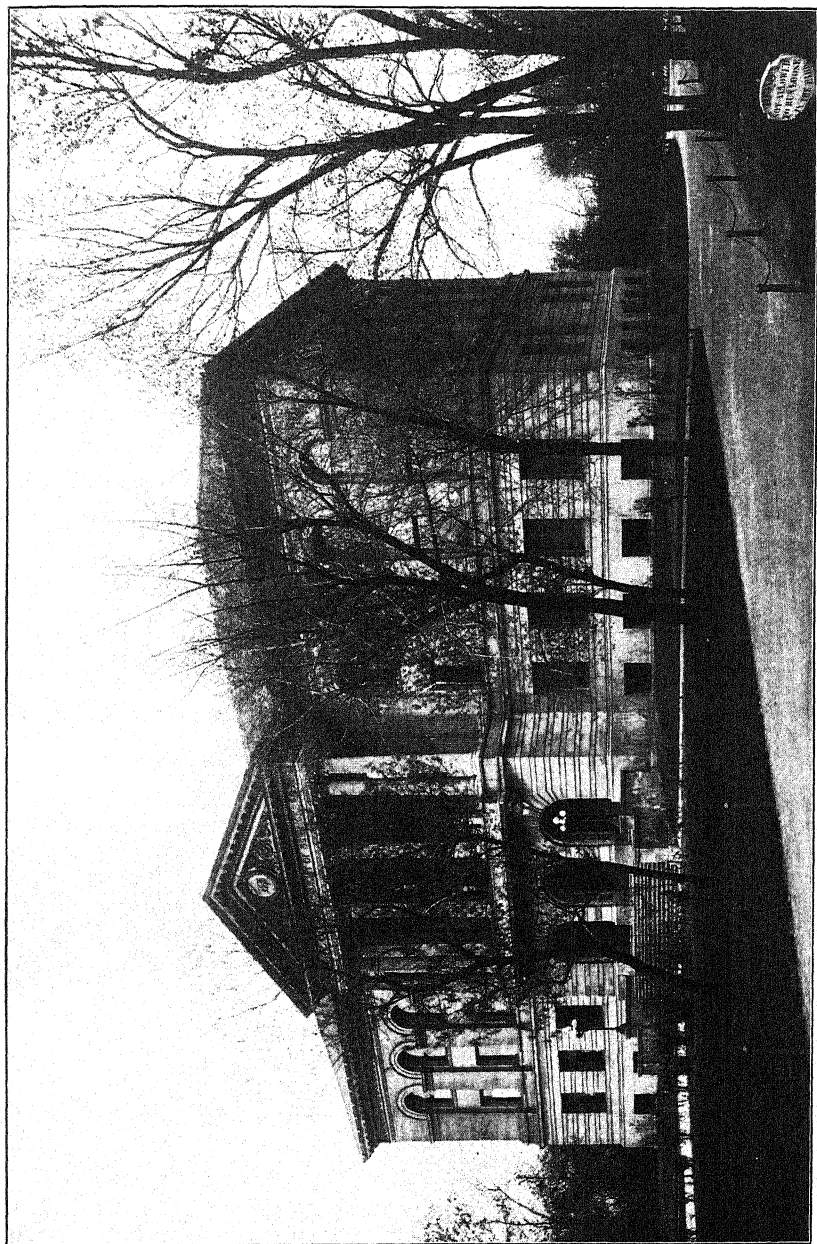
In the year 1857 an association "to promote science" was organized under the name of "The Chicago Academy of Natural Sciences." It began at once to make collections, but the commercial crisis of that year was unfavorable to the development of the enterprise.

In 1859 and 1865 the association was incorporated under the name "The Chicago Academy of Sciences." Encouraged personally by L. Agassiz, they laid in 1863 the foundation of a scientific museum, which was deposited in a house near the present city hall. The collections were enlarged with the help of expeditions, but in 1866 some of them were destroyed by fire, after which accident the academy began the construction of a fireproof building 50 feet long 55 feet wide, and 50 feet high, not far from the present Auditorium.

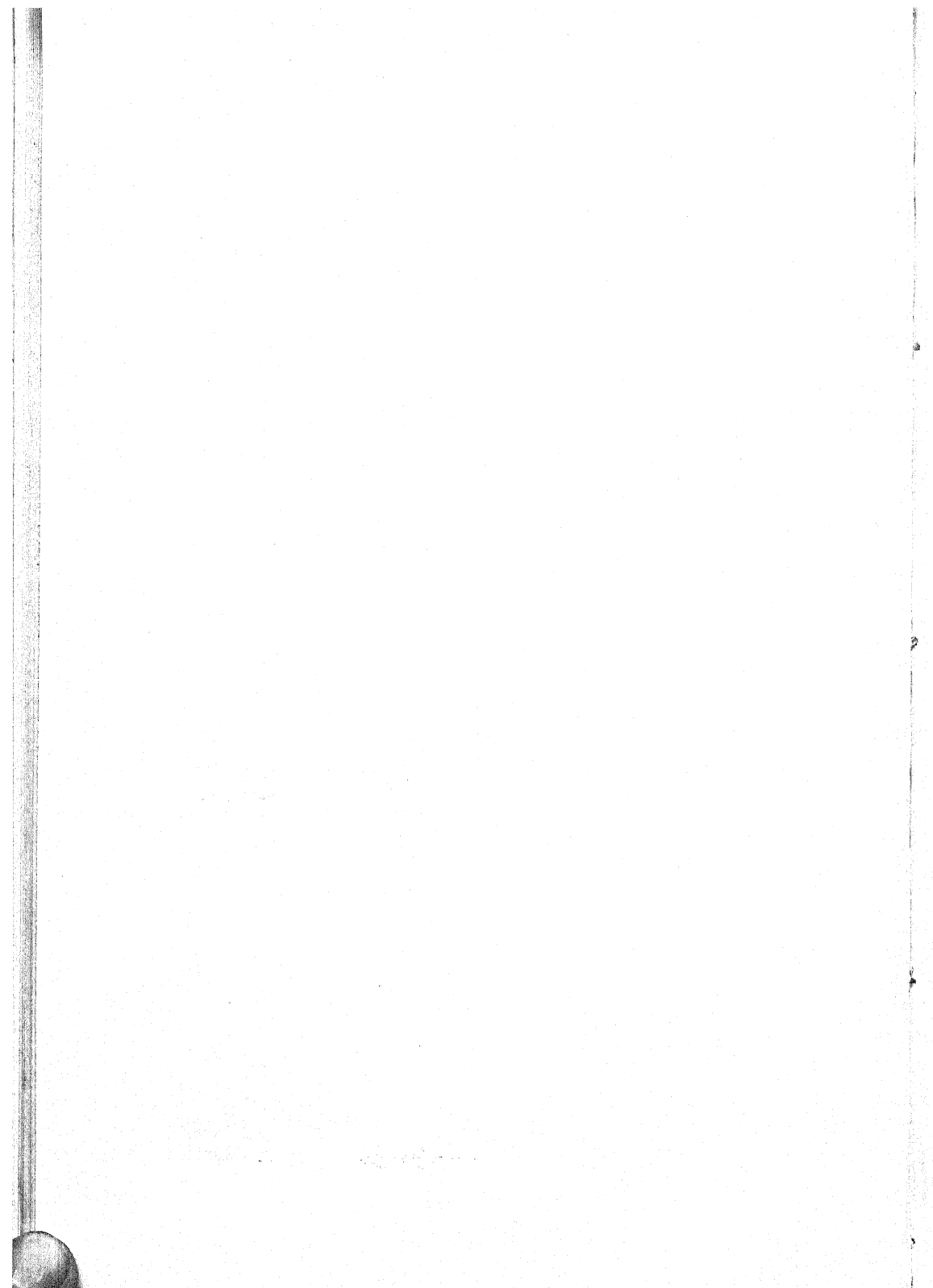
In 1868 the first meeting was held in the new building, which was of brick, the floors of iron and tiles, the stairs and main doors of iron, and the windows with iron shutters. The museum was in the upper story, 28 feet high, a large space with broad galleries, and was soon filled with precious collections, including 10,000 glasses with crustaceans and 8,000 species of marine shells, and the library was also largely increased.

In 1871, at the great conflagration, however, everything was destroyed, although at the beginning of the fire they had trusted in the supposed security of the building, but not the least thing was left of the collections. Not more than twelve days after this disaster it was decided to erect a new building on the same spot. In that building the first meeting was held in 1873, but in consequence of pecuniary difficulties the academy was obliged to leave these quarters in 1886 and store its collections.

In 1891 a plan was considered of associating with the new University of Chicago, but the members preferred not to sacrifice their independence, and when a rich citizen, M. Laflin, offered to spend \$75,000, and the Lincoln Park board offered a space and \$25,000 for a new building, the architects, Normand S. Patton and Reynolds Fisher, of Chicago (now the firm Patton, Fisher & Miller), were charged with making the plans. They designed a building of 750 feet frontage and a dome 130 feet high, of which plan, however, only the northern-side building could be executed (Plate 16). It lies isolated in Lincoln Park, in the northern part of the city, at the lake near the zoological garden and the hothouses of the park, and called after its patron, who died in 1897, the "Matthew Laflin Memorial Building." The museum was opened to the public in 1894. This wing (part) is 133 feet long, 61 feet wide, and 70 feet high, and is fireproof. The wooden floors are laid on cement; the cases, desks, and other furniture, the doors and sash are of wood. With respect to the fireproof construction I



CHICAGO ACADEMY OF SCIENCES.
Completed portion.



received the following information from Mr. Patton, whose acquaintance I had made at the Union League Club of Chicago:

As to the materials of construction, the iron columns are covered with porous terra cotta and finished by plastering with Keene's cement upon the terra cotta. The fireproofing of the building in general is effected by application of hollow tile known under the name of "soft tile," or "porous terra cotta." They are prepared of a mixture of clay with sawdust in the kiln. The sawdust is destroyed and the clay becomes porous or spongy by this process.

The floor arches are of 6 by 6 inch tile, segmental in form, and of about 11 feet span, and resting upon iron beams which run from the outside piers to the corresponding columns of the interior.

The plaster is laid directly upon the under side of the tile arches, so that the ceilings consist of a row of arches.

The roof is constructed of iron supports which, like rafters, run up and down the slope at intervals of about 5 feet. On the upper side of these rafters T supports, 2½ inches broad and of the same height, are laid horizontally at intervals of 2 feet, upon which rest hollow tiles that have the form of books and therefore are called book tile. The book tile form a continuous surface upon which the roof tiles are laid. First the book tile are covered with a waterproof mass and then the so-called "Spanish style" of roofing is applied, where the roof tiles are nailed directly down upon the book tile that let the nails enter easily and also hold them firmly, as they are of porous clay. All parts of the iron frame of the roof are made fireproof by a cover of plastered hollow tile; there is no uncovered metal in the whole building. The security against fire of the vaulted ceiling over the central hall of the museum is effected in the following way: This ceiling is made of a steel frame covered by expanded metal lath, and plastered from below with hard cement mortar. After this plaster has become hard, the exterior (upper) side was plastered the same way, so that the ceiling consisted of a solid mass of plaster about 2 inches thick, in the midst of which the expanded metal is embedded. Thereby it was made so solid that a person could walk on it.

The interior walls of the building are covered with vertical wooden furring 16 inches apart; this is covered with expanded metal lath that is plastered. Here the wooden furring would not allow a fire to spread, because it is inclosed in front by the plaster, on the back by the brick wall, and above and below by the fireproof ceiling.

The staircases are of iron.

In many buildings columns are treated as disagreeable necessities, which are spaced as far apart as possible with little regard to anything except to make them inconspicuous. In this building the columns are treated as the most important feature in the interior architecture. The design of the building proceeded from the interior outward. In the first place, it was determined what should be the proper dimensions of the cases in which exhibits are to be placed. It was found that 3½ feet was the most economical and effective width for the double cases, and that 6½ feet between the cases gives an ample width of alcove; therefore it was arranged so that there should be a case against each pier, and the piers are to be placed 10 feet on centers, and the columns are to be exactly opposite the piers. To this arrangement the exhibition cases fitting in between the columns and the piers on the outside walls, form a part of the architecture of the building; and the windows coming, in every case, in the alcoves between the cases give a most perfect lighting to the specimens. This arrangement of columns will give to the interior an effect of size much greater than reality, and will prevent that appearance of emptiness which museum buildings are apt to have.

As we predict that the exterior of the building will be a prominent landmark in Chicago's architecture, we venture the assertion that the interior, small though it be,

will attract much attention from those interested in museums. There are many museums which appear to have been erected on the theory that they were simply storage warehouses for the safe-keeping of specimens. This building is designed on the theory that a museum is a place for the effective display of specimens; in which case it is important to bear in mind that bare white walls and mean architectural surroundings will belittle the value of whatever is contained therein; while a rich architectural setting will give to the public a true impression of the value of the collections displayed for their benefit. ^a

The plan of this finished wing is one of the best that I ever have seen in a museum, and it is to be regretted that only such a small part of the whole could be executed. The construction was developed from within, since the most perfect use of space was based upon those dimensions of the cases and the space between them that are considered the very best, and not until then were the interior and exterior architecture fitted to these demands. Therefore, as can be seen in

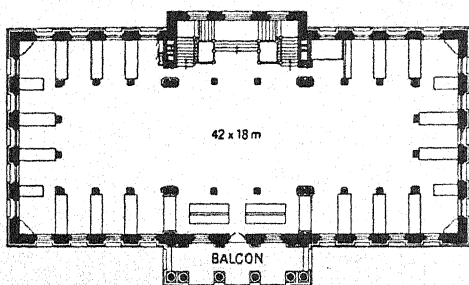


FIG. 40.—Chicago Academy of Sciences. Plan of first floor.

the plans of the first floor and part of the second or gallery floor, figs. 40, 41, the cases all around stand exactly between the columns and the piers between the windows, and they all receive their light from the side except two of them, that could just as well have been placed in some other position. This is, I believe,

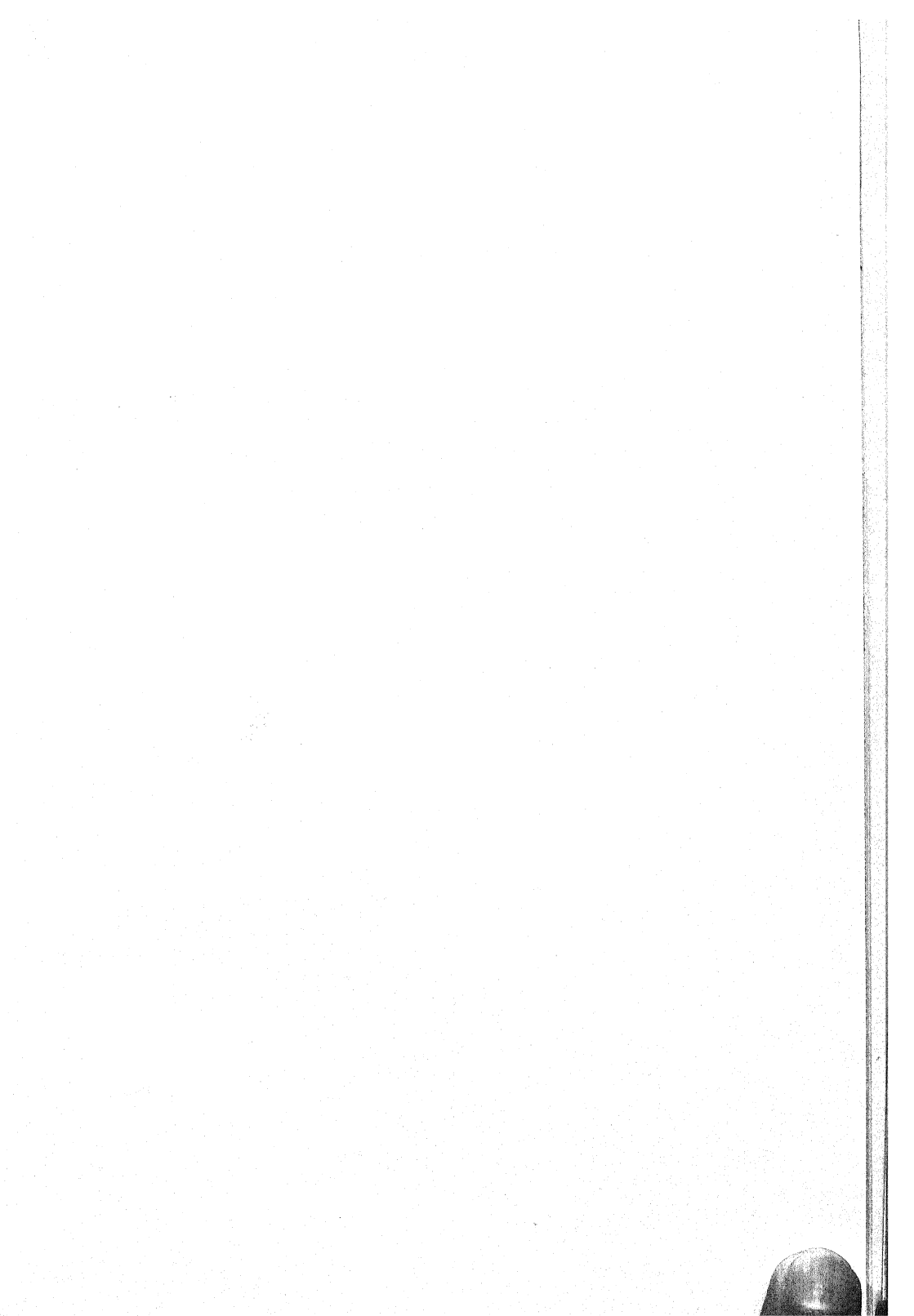
the most correct principle, but the dimensions, without exception, have all been made too small; from this fact, besides some others, the people crowd too much in the spaces between the cases. But this only happened because the means were so limited that the architects were compelled to use minimum measures. Otherwise they would have built on broader plans.

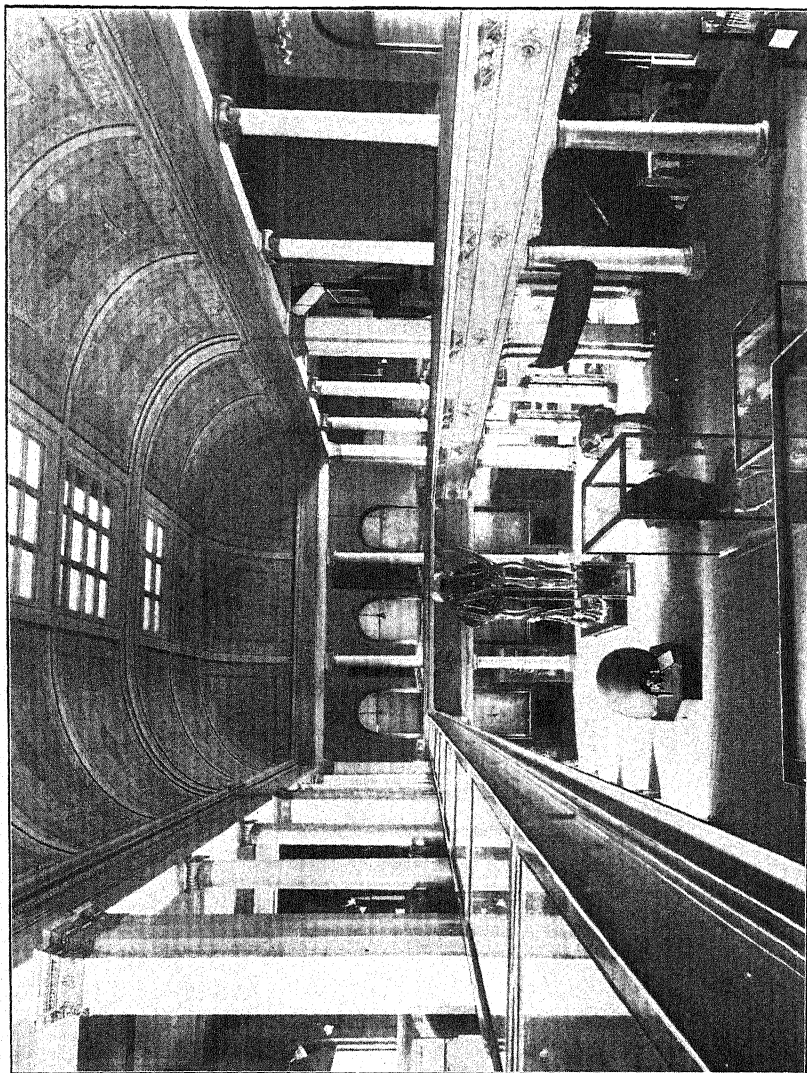
The building has the following horizontal divisions (fig. 42):

1. A high basement for laboratory work, packing, heating, store-rooms, etc., and a dark chamber, partly cemented and furnished most practically.

^a Mr. Patton quite recently, 1903, wrote me in respect to these remarks:

It is a matter of no small satisfaction that my prophecy should come true only ten years later, and that your description would recognize the scientific method which had been applied to the planning of this building. I realize that the dimensions are all minimum, and should be increased, if possible, for any building likely to have such large crowds as visit this building, but when visiting New York City I was struck with the enormous waste of floor area from the lack of attention given to the spacing of the windows, so that comparatively few exhibits could be placed in a given space, and my object was to give the maximum capacity consistent with proper lighting and access.





CHICAGO ACADEMY OF SCIENCES.
Main floor.

2. First floor with entrance hall, that is used for exhibition purposes (in the middle a large group of flamingoes), library, herbarium, besides a lecture room (with book shelves at the sides), offices and rooms for the park board.

3. Second or main floor which, together with the third floor, forms a large hall with light from above (Plate 17). This hall has in its center a room for large animals (mammoth, glyptodon, gorilla, bison, muskox, American elk, groups of lions, etc.); in the cases all around, the vertebrates; also some ethnographical specimens.

4. Third floor or gallery: All around the railings of the gallery are horizontal cases for insects (in the illustration, Plate 17, are seen some other objects in these cases, the pictures having been taken some years ago); in the cases at the window sides are mollusks and lower animals, paleontology, geology, and mineralogy.

5. The attic, which runs all around the vaulted ceiling with skylight, perfectly illuminated, and at the outside walls of which stand storage cases with birds, shells, lower animals, fossils, and minerals; this attic is perfectly fireproof, which fact I especially emphasize, as this is rarely the case in Germany.

It would be difficult to devise a better and more practical use of space. Beside the stairs an elevator runs from the basement to the gallery.

Adopting a combination of ceiling and side light (if for any reasons the first one had to be employed too), the main advantage of the building lies in its being exceedingly well lighted.

The height and width of the windows and the walls between are so excellently arranged that the light flows through all the rooms, and the effect of the ceiling light, which is relatively small, could almost be spared. Besides the reflection of the horizontal cases at the gallery railing, which as everywhere with ceiling lights is very annoying, is diminished by the light flowing abundantly in from all sides. I know a number of similarly built museums, but they either use only or almost entirely the ceiling lights, which arrangement has many disadvantages, or the side light is not made use of either so profitably or so completely.

The wooden cases and desks with their sharp yellow wood color are

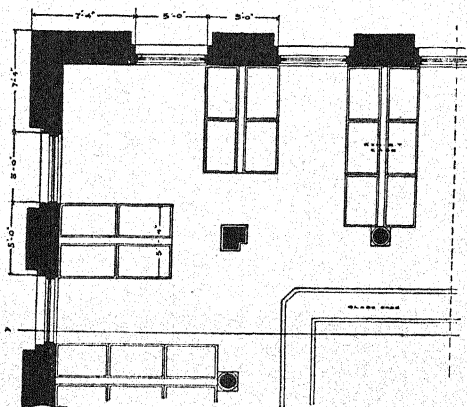


FIG. 41.—Chicago Academy of Sciences. Plan of second or gallery floor (in part).

not up to very strict requirements, but everything was done to make them dust tight, as far as wood will allow it. Some of the larger cases have no doors on hinges, but the frames are tightly screwed on, which fact I have mentioned above at the Field Museum as entirely anti-

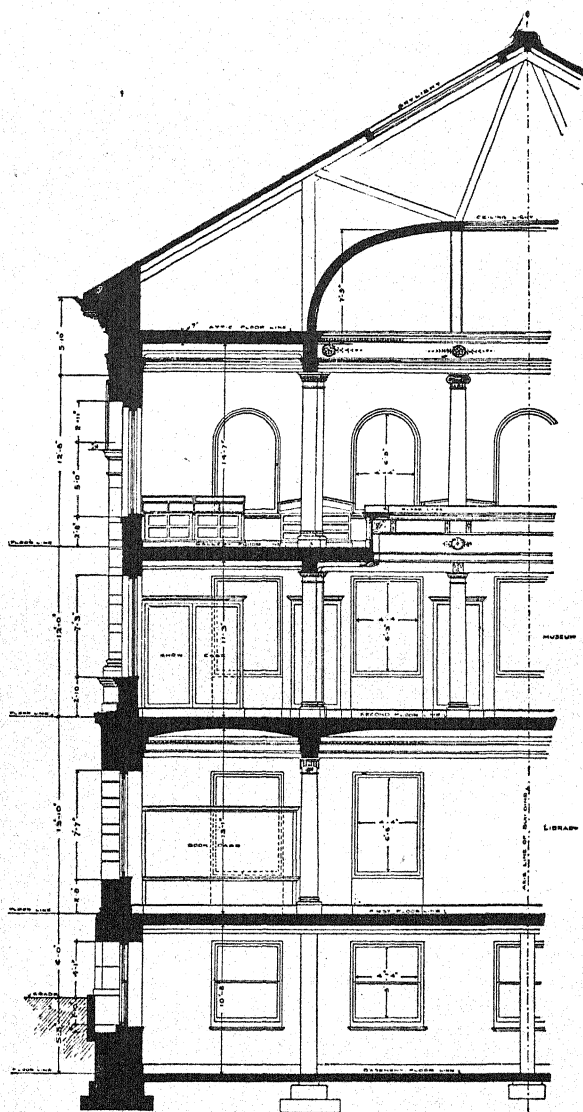


FIG. 42.—Chicago Academy of Sciences. Cross section along the line A B shown in fig. 41.

quoted and not very recommendable. Since the building in other respects is totally fireproof, and after the sad experience of the two conflagrations, it would certainly have been more advisable to use iron furniture instead of wooden.

Since, as we said above, the dimensions of the cases have without exception been proportioned to the dimensions of the entire building, and as I believe this to be the only correct view in buildings of this kind, I shall dwell upon this point a little more explicitly. Generally the architect plans a museum without considering the consequences that are connected with the breadth of the windows and the spaces between, nor does he regard the proper length and depth of the cases. Very often the officers of the museum do not support him sufficiently, since most of them do not care for these specialties; besides, the architect generally does not ask their advice at all. In this way most museum structures are erected schematically, and then the dimensions of the cases must be arranged according to the dimensions of the building, instead of vice versa. In such cases it very often happens that the show cases are set up without consideration of the existing distribution of light. Examples are odious, but it would really be hard to mention a museum at the erection of which the proceedings were as judicious as at the erection of the Academy of Sciences in Chicago, although the dimensions were necessarily too small on account of insufficient funds.

After mature deliberation, the architect had decided for cases of $3\frac{1}{2}$ feet depth, and a minimum free space between them of $6\frac{1}{2}$ feet. This gave a result of 10 feet minimum as the distance between the centers of the piers, and a breadth of 5 feet for the windows. The free spaces in the central portion and at the corners are more liberal in size. In the gallery the depth of the somewhat low cases is almost exactly equal to the breadth of the walls between the windows, as seen from fig. 41, and, according to my opinion, is the most suitable proportion. Although in this instance the intervals are very narrow, the typical length of the cases, which was varied only now and then, was determined at 10 feet 10 inches, with a breadth of 3 feet 6 inches, and a height of 7 feet 7 inches, with one door 3 feet 2 inches in breadth and 6 feet in height, having one plate of glass for each of the three divisions of the length. I do not want to criticise these dimensions, but mention them only to show how considerably the architects proceeded, and how much one dimension depends upon the other, if once established.

According to need, a partition and shelves are put into the cases, and I only have to say that the shelf brackets are adjustable, so that horizontal or slanting shelves may be used; there are also arrangements made to separate the case divisions from each other by partitions, according to the doors. Therefore, all the cases, as well as their interior arrangements, can easily be interchanged. All these things seem very simple and self evident, but such a care for details we find but rarely, if ever, among our museum of architects.

The length of the cases determined exactly the position of the iron

columns that run through from the basement to the top and are, as we have said, fireproof covered. They all stand (see fig. 40) at the interior side of the cases. This also seems to be simple, natural and evident, but only look at the museums in regard to this point! At the American Museum of Natural History in New York City, that modern, magnificent edifice, the front was constructed without taking into consideration the dimensions of the cases—a mistake that, as stated above, is made almost everywhere—and the columns inside in the halls do not correspond with the piers between the windows, so that the columns and the show cases come into conflict with each other. With how many museums is this the case! In the Academy of Science of Chicago the cases determine the interior architectural divisions, and this is the only correct principle. In the same way, the gallery railing, with its desk cases, is organically connected with the architecture, not attached externally, as we so often find.

I again emphasize my opinion that I do not consider the chosen dimensions to be the most happy ones, although they were directed by the narrow space available. I only tried to show the rational principle that was hereby followed and was worthy of imitation. The building, situated in a very much frequented public park at one of the greater traffic streets, must be built to offer a pleasant view externally, and therein the architects were very successful with a modern French Renaissance style. For the same reason the front must be made of a good material (limestone), and as the means were not sufficient to make it longer, the height was necessarily proportioned to the dimensions of the available ground, and consequently the height of the single stories had to be reduced to a minimum measure, or else it would have been too uniformly square. If the architects had not thus been hindered their intellectual planning would have produced still better results.

Since the distribution of light is so very excellent in the building, I think it to be an advantage to mention the height of the single stories and the situation and size of the windows.

	Ft. in.	
Basement in clear	10	6
Height of window	5	0
Height of sill	3	6
First story in clear	12	6
Height of window	7	0
Height of sill	2	9
Second story in clear to gallery	11	0
Height of window	6	6
Height of sill	3	3
Gallery in clear	14	0
Height of window	7	0
Height of sill	2	9
The vertical height in clear of the middle ceiling light is 34 inches.		

The space under the horizontal cases is provided with cases with drawers for scientific collections; it is not hollow and covered in, as at the Field Columbian Museum. The arrangement with interchangeable drawers is good. Excellent order exists everywhere.

Great care is applied to the art of taxidermy, but some of the older specimens are not ornamental to the museum.

The labeling is with instructive descriptions printed at the museum, and the work is executed in general with the greatest care and a great deal of pains, as shown in fig. 43, the interior of the case of fossils. In the drawers the objects lie loose in cardboard boxes, and in the exhibit collections they rest upon labels of cardboard with paper pasted on, therefore there is no permanent arrangement such as could be attained with thin metal plate; but the strength of the cardboard and the color of the paper are selected after much experimenting, and the appearance of the tablets is excellent, at least for the present.

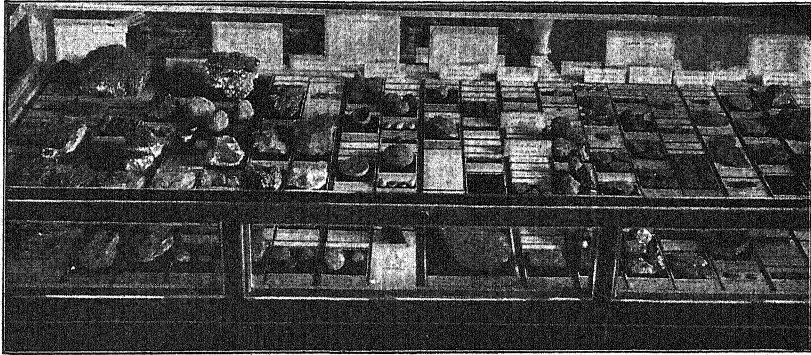


FIG. 43.—Chicago Academy of Sciences. Case showing fossils.

But in time the cardboards warp and the cream color fades, for the museum is open to the public daily from 9 a. m. to 5 p. m. (on Sunday from 1 to 5 p. m.), and the collections are so long exposed to the light that they must become injured sooner than necessary. The labels are 3, 6, and 8½ inches long, and 2, 4, 6, and 8½ inches wide, not to mention extra sizes. They are either printed directly on the cardboard or on paper of the same color, and pasted on the board. The printing types are especially attractive. The paper used is called "star manila;" the cardboard is a seventh of an inch thick, with a border of black gummed paper, and covered with the manila paper so that a black rim remains. If a black background is required for the objects, the yellowish paper is again covered with black paper, as on paper boxes. The whole arrangement is neat, and you rarely find so much care taken in other museums.

According to European custom, the name "Academy of Science" is rather misleading, for an academy of science in Germany means an

institution comprising all branches of letters and science, while the Chicago institute is an association that has for its object "to improve and propagate scientific knowledge by lectures and publication of original essays, by a library and museum, as well as by such measures as are adapted to awaken interest and promote scientific research." In this quotation the words "scientific" and "science" mean almost exclusively natural science. In former times Americans used high-sounding titles everywhere, as in hundreds of lower-grade schools that called themselves "universities," and the "Academy of Science in Chicago" thus bears an improper title that was accepted in 1857. I think the correct name would be "Natural History Society of Chicago," and so it should be changed. The academy is divided in six divisions: Astronomy and mathematics, photography, chemistry, geology, entomology, and biology. The association has ordinary and extraordinary members, who pay a fee of \$5 a year (the ordinary also pay an entrance fee of \$10); life members, who pay a single fee of \$500, and patrons, who pay \$2,500 at one time. It also has honorary and corresponding members. The board consists of a president, a vice-president, a secretary, and a treasurer, with ten trustees, among them the president of the Lincoln Park board. Only eight persons receive salaries—a curator, the secretary, a preparator, a clerk, a supervisor, three janitors, which, even for this small museum, is an unsatisfactory number of officers. With the supervision of the building during the time visitors are admitted, only two persons are charged; the public, in general, controls itself. The curator of the museum, a professional man, is in all his plans dependent upon the decisions of the trustees, who are nonprofessionals; a fact that is not very favorable to the progress of the museum. This kind of obstacle does not exist to such a degree in Germany, unless it be in certain "purchase commissions." The impairing influences, however, are even here not wanting, but lie more in those who have to do with assigning the moneys, and who are less appreciative of the educational value of the museum, and thus, as is the case in America, they economize at the wrong end.

The annual revenues of the academy are \$5,000 from the Lincoln Park administration, spent for salaries, and the fees of the members, amounting to \$1,500, spent for administrative expenses. The park board also pays for heating, illumination, cleaning, and repairs of the building, and pays the three janitors. If more money is needed for administrative or for purchasing purposes, or for expeditions, etc., appeal is made to the liberality of the members or the public, and always successfully, though until now in very modest limits compared with other similar institutions in America. In 1900, \$8,000 was expended.

A special division with its own publications, the Natural History Survey of Chicago and environs or vicinity, was established in 1892.

The academy issues Transactions (two vols. in quarto, with 35 plates, 1867-1870), Bulletins (two octavo volumes since 1883), Annual Reports (1895-1897), Catalogues for exchange, and Bulletins of the Natural History Survey (formerly Geological and Natural History Survey), four of which were issued and several others are in preparation. These publications are treatises especially on the branches of paleontology, zoology, and botany of the country. The library is almost exclusively augmented by exchanging the above publications, the publications of more than 200 other institutions, and contains 10,000 volumes and several thousand pamphlets.

The meetings of the academy in which scientific lectures are given take place monthly, and besides these, weekly popular scientific lectures are given during the winter season. In 1900 twenty-five such lectures took place and were patronized by 7,000 persons. The lecture hall holds about 300 persons.

The museum had 300,000 visitors in 1900, from 25 to 5,000 daily.

The increase in the collections amounted to 7,600 specimens in 1900, 1,000 of which were by exchange. The entire number of specimens was 150,000, among them 75,000 mollusks, 30,000 arthropodes, paleontological and botanical objects, 15,000 each, 5,000 mineralogical objects, and 4,000 birds.

The museum of the Chicago Academy of Science will certainly develop itself from these existing beginnings, for it contains even now many original and suitable features, and the building itself must be considered as a model of a smaller museum building. On account of the careful planning of the whole, and especially on account of the practical views the architects so preeminently followed, it would be greeted with the greatest satisfaction if the rich citizens of Chicago who patronize museum interests would at this time not only favor the Field Columbian Museum and the Art Institute, but also help the academy to such a success as it deserves by reason of its modest yet praiseworthy accomplishments, compared with other great American institutes. A city like Chicago, with its extensive area, should not only have two great museums for natural science, but they are really a necessity. Therefore a "*crescat, floreat*" is certainly in its place.

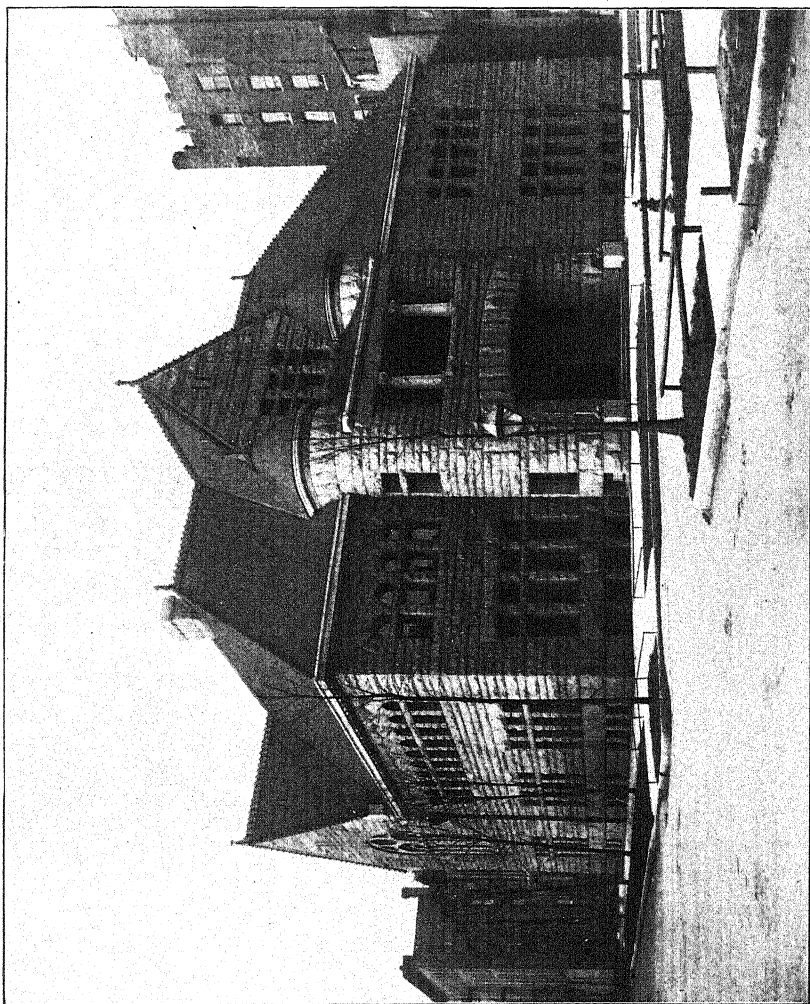
II. CHICAGO HISTORICAL SOCIETY.

The Chicago Historical Society was founded in 1856, and in 1857 incorporated by the State of Illinois. Its object is to institute and encourage historical inquiry, to collect and preserve the materials of history, and to spread historical information, especially with regard to the Northwestern States. In 1868 it occupied its own building, whose construction had cost \$60,000, but the great Chicago fire in 1871 wholly destroyed it, together with the entire collection of over 100,000

objects, books, etc., having a total value of \$100,000. In 1872 the society was reorganized, but in 1874 a second time lost its collections by fire. In 1877 it was organized anew and soon installed in a temporary building. Its present structure at 142 Dearborn avenue, not very far from the Academy of Sciences (see p. 430) and the Newberry Library (see p. 459), was begun in 1892 and the society moved into it in 1896. It was designed by Henry Ives Cobb, architect of the Newberry Library and of the University of Chicago, in a Romanesque style, and cost \$190,000, which was contributed by the members. Unfortunately a ground plan of it could not be obtained. The collection contains pictures, including 75 portraits in oil, manuscripts, historical reminiscences of Chicago and the Northwest, prehistoric objects, together with a library of 26,000 volumes and 60,000 pamphlets, relating chiefly to historical matters. This library is placed in the back part of the second story, where the high windows are seen in Plate 18. The museum is in rooms on the ground floor and on the second floor. In the right wing in the illustration is a large and lofty lecture hall. All of the rooms are particularly well lighted.

What makes this structure uncommonly interesting and wherein it is unique, as far as I am aware, is the fact that, made wise by two grievous disasters, an absolutely fireproof building has been produced, in which the use of wood has been entirely avoided. All is of stone, brick, cement, and the like—iron and glass. The only combustible things that I saw there, besides the books, papers, and collections, were the curtains and carpets in the auditorium. The entire structure consists almost wholly of large intercommunicating rooms, each of which can be closed off by iron doors, so that it forms a "safe" by itself. The city furnishes the electric light. It is heated by natural gas brought from a distance of over 150 miles. The large, open, heating rooms in the basement, besides, are entirely isolated. Window frames, doors, stairways, book stacks, show desks, and similar structures are made of iron and stone, as are also all utensils and furniture, such as writing desks, tables, chairs, and the like. The shelves to the iron book stacks are stone slabs. The neighboring houses, some of which are very high, as will be seen from Plate 18, can, on this account, hardly be considered as a danger, although one would be glad to see them farther away.

The right conception here shown of a secure building seems to me well worthy of imitation, for I am of the opinion that in this way, and no other, should museums and libraries be built and furnished. What, indeed, hinders this, except the prejudice which exists in many quarters (even in Chicago, as we shall see in the Newberry Library) against iron, except the designs of those architects who continually build from the same "ready-made" plans, formal and without originality, and except the lack of proper qualifications in those to whom museum



CHICAGO HISTORICAL SOCIETY.

interests are intrusted? Ever since the year 1878, when I became acquainted with the Royal Library in Stockholm, which stands isolated upon a spacious plaza and is a fireproof building of stone and iron, I have advocated this principle for museum buildings, but for the first time in the building of the Chicago Historical Society I found my idea absolutely carried out, for even in Stockholm they have not proceeded with such thoroughness.

In the ironwork itself the historical museum does not excel. The iron is not adequately treated, it rusts at the window frames, under the tables, etc., because the proper materials were not used in painting and varnishing.^a Besides, the iron furniture is clumsy and often over ornamented, although now, at least in America, iron furniture is produced of ornamental and tasteful design (as already mentioned, p. 380), whose external appearance exactly simulates wood. Just as clumsy are the iron show desks, provided as they are with a primitive arrangement for raising the lid that allows the dust to sift in. Upright cases are not used. The iron book stacks, too, do not show the neatness usually seen in such work in America (see pp. 371, 382, 399 of this paper), and as I shall describe hereafter, in the Public Library of Chicago. Book shelves of sheet iron would be preferable to those of heavy stone, which look clumsy.

In spite of these criticisms I can only again urge that the general arrangement is in principle entirely correct, in execution excellent, failing only in a slight degree to meet rigorous requirements, so that as a whole it is to be most earnestly recommended to all museums for imitation. In my eyes, at least, the Historical Society of Chicago has performed a great service in that it has carried out the idea and especially that it has created a model. There is at present no published description of the structure, but one is contemplated.

Since 1882 there have appeared four octavo volumes of Collections besides Proceedings and Annual Reports.^b There are four regular sittings during the year.

The society has life members (32 during 1894) who paid a single fee of \$500, annual members (now 180) who pay an annual fee of \$25, besides honorary and corresponding members. It also uses for purchases the interest on its invested capital of \$75,000, but has no support at all from the State or the city. Its yearly income for administrative purposes reaches \$5,000.

^a See on this subject B. E. Simon, *Ueber Rostbildung und Eisenanstriche*. Eine kritische Studie. Berlin, 1896, 43 pp.

^b A list of other publications of the society from 1856 on is found in the Annual Report of the American Historical Association for the year 1890 (Washington, 1891, pp. 197-203); also in the report of that association for the year 1895. For general data relating to the society see Chicago Historical Society—Officers, Members, Constitution, By-laws—Chicago, 1894, 22 pages, and the chapter on this subject in History of Chicago, R. Blanchard, I, pp. 640-647, 1899.

12. ART INSTITUTE OF CHICAGO.

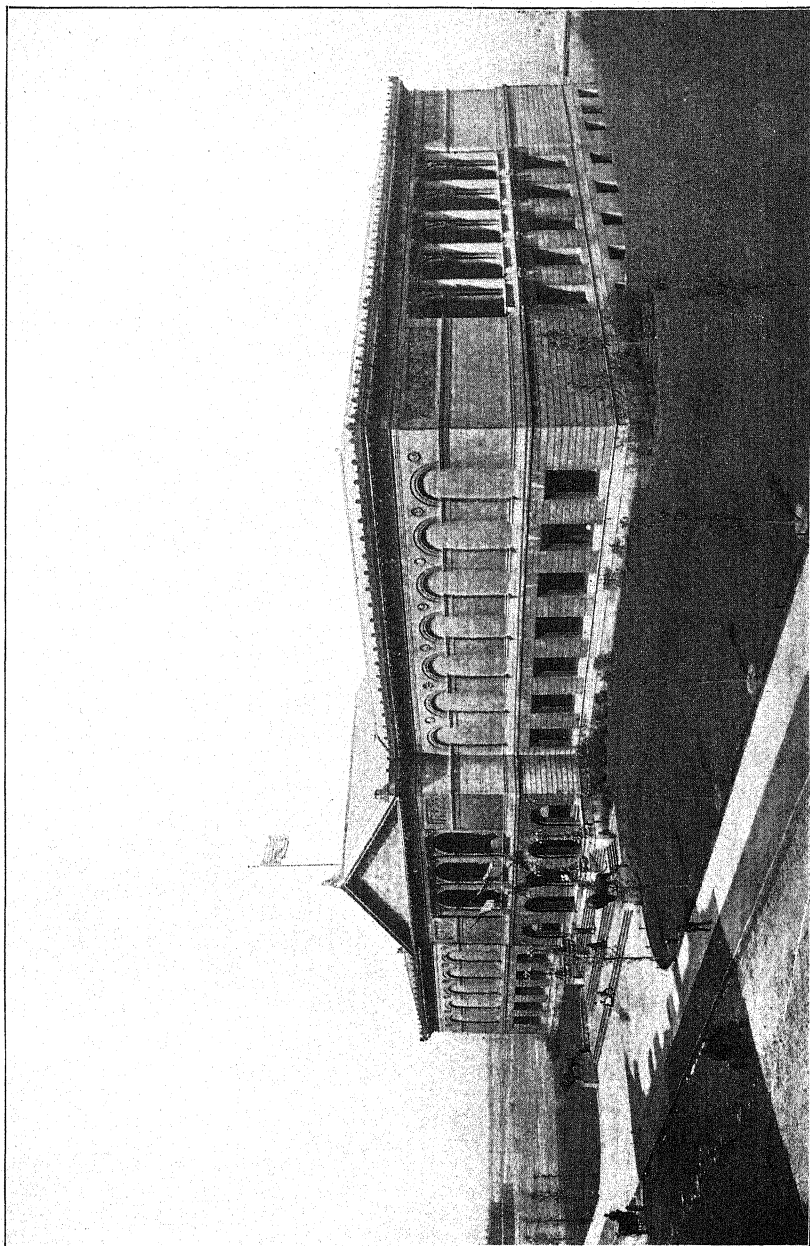
From an art school founded in 1866 rose The Chicago Academy of Design, which until 1882 was the only notable art center of the city. In 1879 it was organized anew as the Chicago Academy of Fine Arts, and incorporated by the State "for the founding and maintenance of schools of art and design, the formation and exhibition of collections of objects of art, and the cultivation and extension of the arts of design, by appropriate means." In 1883 it was given its present name.

First installed in rented rooms the society obtained in 1882 and 1885 (obliquely across from its present home) a large piece of ground, upon a part of which it built, but in 1886 it erected there a fine museum, 100 feet long and 87 feet wide, of a Romanesque style, after plans of J. W. Root (Plate 21). As this soon became too small it was in 1892 sold for \$400,000 to the Chicago Club^a in order that there might be erected in 1893 the present spacious building, near the edge of the lake, in the extensive Lake Front Park.

The origin and history of the present building is not without interest. It shows what advantage a great exposition may be to the development of a city. We have seen this already in the Field Columbian Museum. Buffalo, also, in this year (1901), doubtless will obtain important benefits through the Pan-American Exposition (see p. 405). The Chicago Exposition in 1893 needed a building for holding congresses, and by mutual agreement with the art institute this one was built upon a site belonging to the city, on the lake front, near the busiest section. The exposition paid \$200,000, the art institute \$500,000, and the city gave the site, 425 feet long, on the broad Michigan avenue under the condition that the property rights in the building should belong to it, but that the art institute should occupy it rent free, so long as they use it for its present purposes. The art institute therefore presented it to the city. The plans were made by the architects, Shepley, Rutan & Coolidge, in Italian renaissance style, the details "classic and of Ionic and Corinthian orders." The magnificent bronze lions of E. Kemeys flank the broad stairway of approach. The building is 350 feet long, 185 to 225 feet wide (the Dresden gallery of paintings occupies only about half the space), and 75 to 85 feet high from basement up. It is fireproof, being built of Bedford limestone and brick, but the floors and window frames, doors, skylights,^b and furniture are of wood, and in some cases the partitions are wainscoted with it. The steam-heating

^a "I had the privilege of frequenting this club. The high, spacious halls, with an unobstructed view of the lake, together with the conveniences which American clubs of the first rank offer, make it an uncommonly attractive place of resort.

^b In some rooms there are mosaic cement floors. It is intended, sometime, to lay all the floors in this way as well as to replace some of the woodwork with iron.



ART INSTITUTE OF CHICAGO.



apparatus is kept in a small, detached building. Natural gas is used for heating (see p. 440). In the house itself no fire is allowed to be lighted. The heating coils stand exposed in the middle of the hall, which is rather unsightly.

The fire service is especially well organized. The building and the collections are insured by a company which maintains a watch service for all its large customers. In every room there is an alarm. The watchman, who carries a lantern and does not use the electricity which is installed throughout the building, strikes this alarm hourly throughout the night, and thus a direct telegraphic communication is established with the watch room of the insurance company, and the official there knows whether each room has been inspected every hour. If the signal is omitted at any time some one immediately appears at the building from the fire-insurance company. Each morning a card showing the night report is sent to the director of the art institute. Through these precautions, in the special interest of the insurance company, great security is obtained, an arrangement certainly worthy of imitation. It is intended, however, to stop the insurance, which is practicable because of the isolation of the fireproof building—on the one side facing the lake, on two sides entirely free, and on the side toward the city 175 feet from the nearest buildings, which are also fireproof. Behind the museum, however, the railroad runs along the lake front, which, with its vast commerce, may well occasion some trouble.

For economical reasons ventilating apparatus was not provided. In the second story, however, panes of the lower skylight can be opened and fresh air admitted through windows below the roof (see fig. 44, arrow) into the empty space between these skylights and the fixed glass roof. On the ground floor air may be admitted by opening the large plate-glass windows, without crossbars, which turn vertically around an axis, a practical arrangement worthy of imitation, by means of which crossbars and their injurious effects are avoided.^a It can be easily understood that this kind of ventilation is insufficient when the building is crowded with visitors. In the smoky atmosphere of Chicago, where soft coal is burned, the exterior of the beautiful museum is defaced in an ugly manner (as are the buildings in Dresden), and this also occurs in the interior, especially on the plaster casts. This last drawback could at least be avoided by ventilating with purified air and closed windows, as I have found done in various buildings in America (see for example the remarks below on the Chicago Public Library), an arrangement with which we are unacquainted in Germany.

^a The panes are 10 feet high and 7 feet wide. Only every second window can be opened. To fit tightly some material is attached. Double windows are considered necessary. Neither frost nor condensed vapor have any bad effect on the interior, owing to the effective heating. During my visit one of these great panes was shattered by a football hurled against it during a game in the park meadow.

In the plans^a (see figs. 45 and 46) the building is simply arranged in a succession of large and small, broad and narrow rooms, and it is therefore easy to find one's way.

The light lines in the plans show rooms that are not yet built, among which is (20) a lofty hall for architectural casts, which is to be 240 feet long, 65 feet wide, and 36 feet high, and will soon be taken in hand; the monumental stairway is also wanting as yet. In the well-lighted

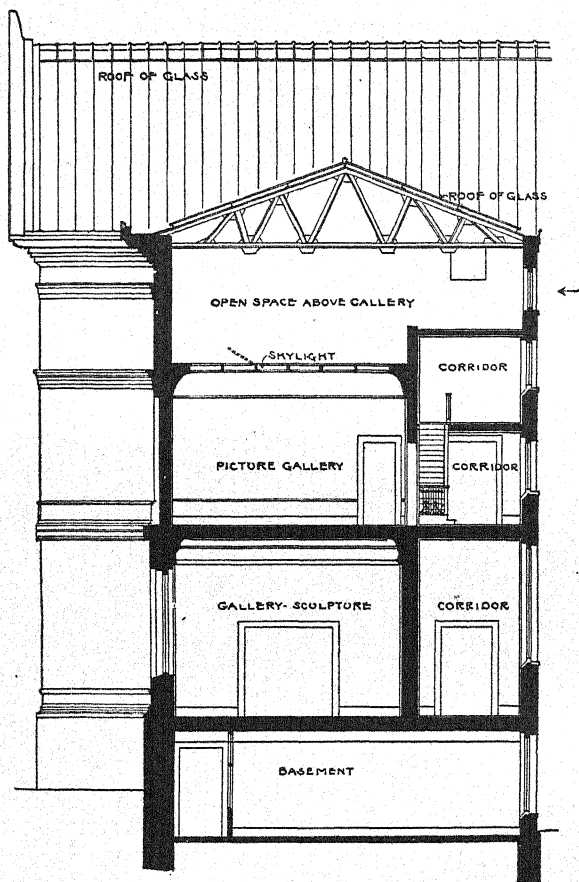
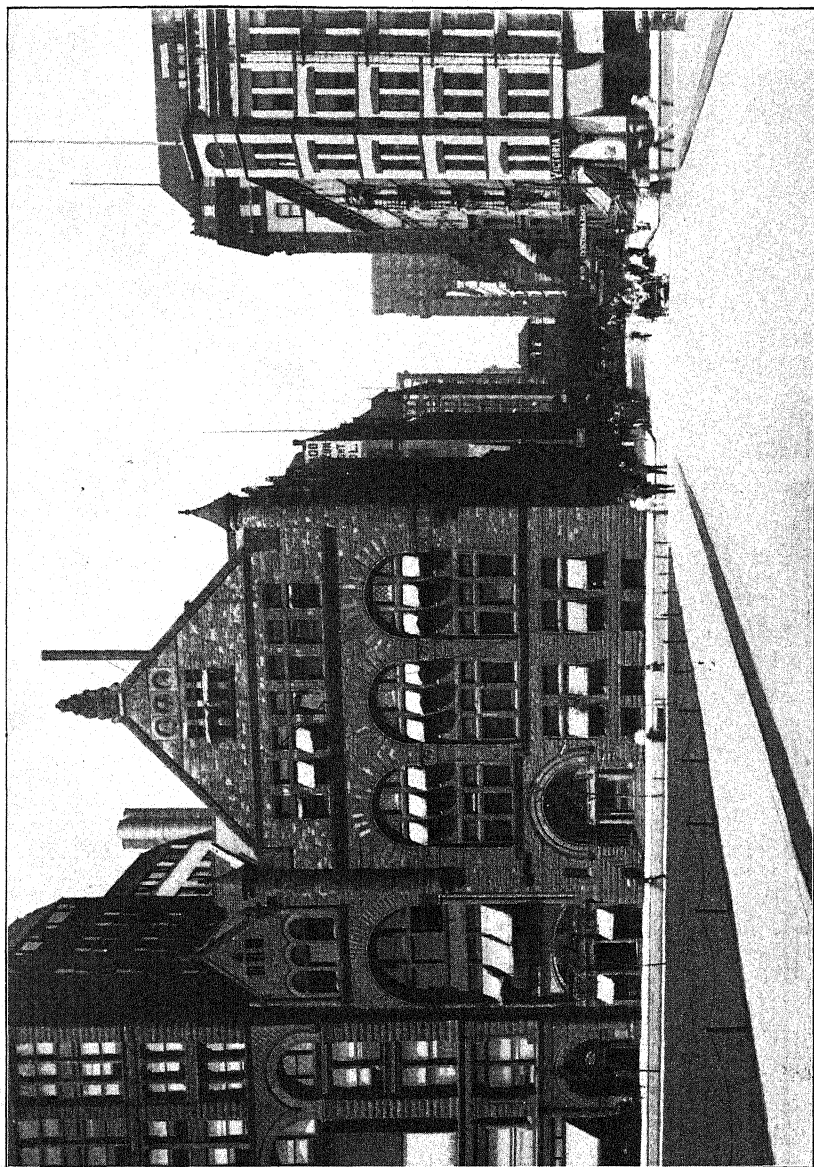


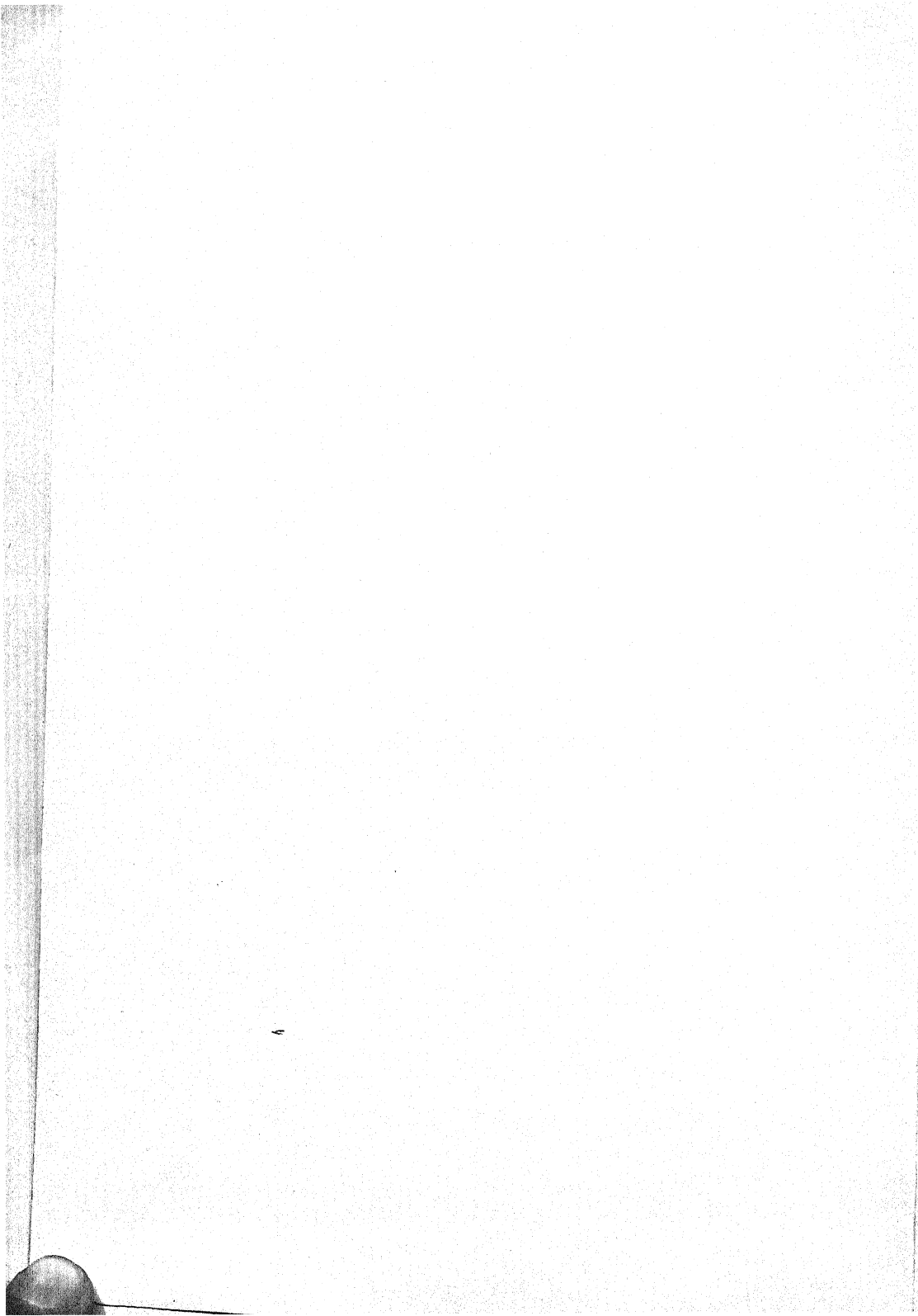
FIG. 44.—Art Institute of Chicago. Cross section.

basement, 12 feet high, are 20 rooms used as storerooms, packing rooms, lunch rooms, and for the art school that has, besides, 15 fire-proof, skylighted rooms, situated in the rear, practically arranged, but somewhat contracted. These must eventually be torn down and moved forward when hall No. 20 of the first floor comes to be built,

^a Compare also the plans published by A. Tiede, Museumsbaukunde, in *Baukunde des Architekten*, II, 1898, p. 30. The text, pp. 31-33, contains many inaccuracies.



ORIGINAL BUILDING OF THE ART INSTITUTE OF CHICAGO. (NOW THE CHICAGO CLUB.)



which, as was said, will soon be done." As can be seen from the vertical section (fig. 44), there are a few rooms in a half story over the second floor (the uppermost of the "corridors"). There are, in fact, three of these on the inner side of each wing. These also serve the purposes of the art school or are used for temporary exhibits connected therewith. The halls of the first floor are well lighted, but they are too narrow for sculptures. In order to obtain a vista through the doors of the front halls from one end of the building to the other, which gives a pleasing effect (Plate 21), a row of casts has been shoved back (they are set on rollers) against the narrow window

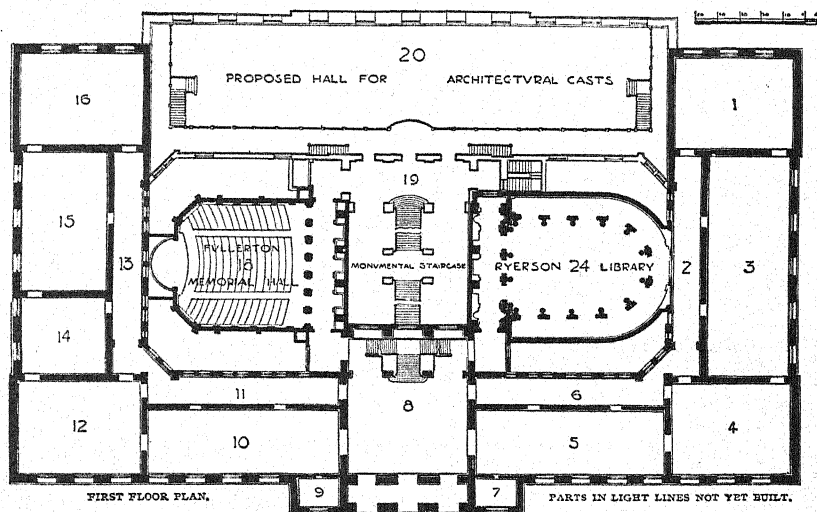


Fig. 45.—Art Institute of Chicago. First-floor plan.

Sculptures: 1, Egypt and Assyria; 2, Asia Minor and early Greece; 3, age of Phidias; 4, later Grecian; 5, Roman; 6, Renaissance; 8 and 10, modern; 11-13, French (including architecture); 7, director; 9, secretary; 14, bronzes, reproductions after those of Pompeii and Herculaneum; 15, Egyptian and classical antiquities; 16, library (until room 24, now building [ready since 1901], is ready); 18, lecture hall; 20, projected hall for architectural casts. The light lines indicate rooms that have been planned but not yet built.

sides, so that it is necessary to look against the light. For the larger pieces it would have been desirable to have the halls, which, besides, are crowded, higher than 20 feet. The building of the lecture hall (18), the library (24), and the staircase, when completed, will interfere with the lighting of the corridors (2, 6, 11, 13), as they can then receive light only through a shaft. The second floor, including the corridors (29, 33, 37, 44), is divided into 15 beautiful lofty halls, 18 to 25 feet high, lighted from above. The entire structure is provided with a glass roof, but every room has a glass skylight ceiling of its own set below this (see fig. 44). The space between this glass ceiling and the fixed glass roof, 5 feet 6 inches to 13 feet high, serves, as

already mentioned, for ventilation. The oil paintings are all covered with plate glass which renders their inspection difficult, but a few of the picture halls, furnished with red plush hangings and dark wooden wainscoting in unusually good taste, are exceedingly charming, and as they are moderately filled with masterpieces they make, with their subdued light, a most agreeable impression. Instead of tempering the light in the middle of the room with cloth in the usual manner, glass decorated in colors is used, which, however, absorbs much light and diverts attention from the exhibits (Plate 22). The lecture hall (18), which occupies both the first and the second stories, holds 500 persons, and is one of the most pleasing halls of the

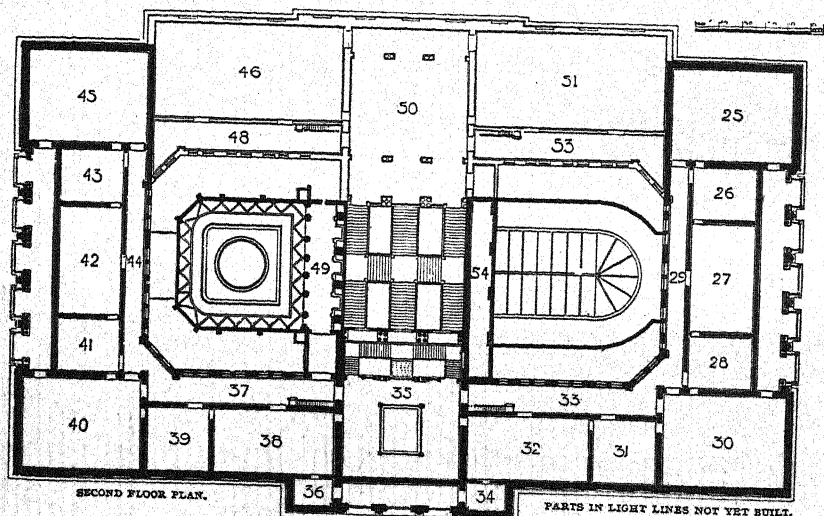


FIG. 46.—Art Institute of Chicago. Second-floor plan.

25-31, temporary exhibits; 32, paintings of old masters; 33, reproductions of the Arundel Society; 34 and 36, committee rooms; 35 and 37, sculptures and paintings; 38-40, paintings; 41 and 42, paintings, Chinese and Japanese collection; 43-45, works of art, musical instruments, etc. (because of continual additions the arrangement changes). The light lines indicate rooms that have been planned but not yet built.

kind with which I am acquainted. The library (24), which likewise extends through both stories, was not completed in 1899, but is now almost ready, a patron of the institute having expended \$50,000 for it. The entire cost of the building up to the end of 1899 was about \$700,000. For the completion of the scheme as shown in figs. 45 and 46, \$200,000 more are needed, which is now being collected.

The Art Institute is entirely independent and obtains no support from the city, to say nothing of the State, except that the city, as already mentioned, gave the ground for a site, in exchange for which it obtained the property right of the building. The yearly expenditure for 1899-1900^a was about \$90,000, the art school costing \$38,000, which

^aSee Twenty-first Annual Report, June 1, 1899, to June 1, 1900, 94 pp.



ART INSTITUTE OF CHICAGO.
Hall of sculpture.

was, however, wholly repaid by the pupils. The \$50,000 for the institute proper is divided, in round numbers, as follows: Salaries, \$23,500; cost of temporary exhibitions, \$7,400; heating and lighting, \$4,300; printing (17 catalogues and the like, and many circulars), \$2,400; postage, \$2,800; insurance and watch service, \$2,000; lectures, \$2,300; purchases, \$1,000; miscellaneous, \$5,000. The receipts were as follows: Dues of members, \$32,000; admission fees, \$4,500; sale of catalogues, \$1,200; sundry receipts, \$6,800; deficit, \$7,500.^a

At the head of the institute is a board of trustees of 23 persons, who from their number select a president and a vice-president, as well as an executive committee of seven and an art committee of five members. The society had, in June, 1900, 245 "governing members,"^b who are elected and who pay an entrance fee of \$100, and \$25 annually; 2,140 annual members who pay a yearly fee of \$10; 84 life members who pay a fee of \$100 at one time, which must be invested; and 8 honorary members. The museum is controlled by a director, with a secretary, a treasurer, a librarian, and some assistants. There are besides 4 clerks, 1 engineer with assistants, 1 attendant with assistants, 1 janitor, 1 house servant with assistants, 9 watchmen for day and night service—together 30 salaried employees, exclusive of the teachers at the art school. But as the director has also to conduct the art school and lecture there (he is besides a teacher in the University of Chicago), there is placed upon him an enormous burden of work. The necessary subordinate heads of divisions are wanting, and thereby the scientific use of the material of the museum is not assured, a state of things which can not last. A museum that does not publish lives only for the narrow circle of its visitors and not for the rest of the world, but since it is wholly dependent upon and receiving from this outer world, it is morally bound to give an adequate equivalent. In America, as I have already several times said, there is generally too great parsimony in museum service, and the employees are thereby overworked. It is also worthy of remark that an employee in America can not, as in European institutions, withdraw and intrench himself behind "official business," but he must always be ready to talk to anyone and be at anyone's service.

The collection is open week days from 9 a. m. to 5 p. m., and Sundays from 1 to 5 p. m. Admission is free on Wednesdays, Saturdays,

^a Such a deficit is always quickly made up. For instance, there was in the previous year \$4,000 due for interest on borrowed capital, but upon appeal there was, within ten days, \$110,000 raised from 60 persons, in sums from \$500 to \$1,000. Since the organization of the society, \$500,000 in cash has been given. Various legacies, amounting to from \$200,000 to \$225,000, are not yet available, but are to be kept as capital. Up to the present time \$100,000 is capitalized, for the greater part for special purposes, such as the purchase of pictures, scholarships, etc.

^b The entire property and the control of the art institute are vested in the governing membership, limited in number to 250, who hold it in trust for the public.

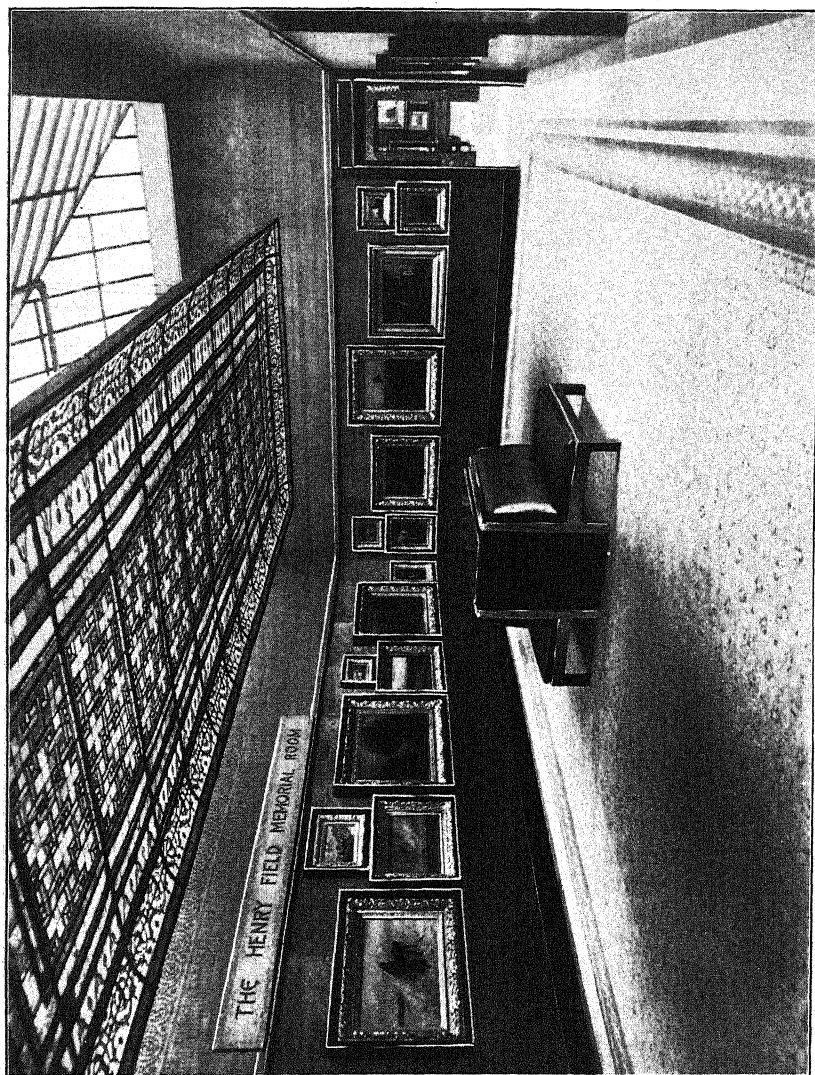
and Sundays;" on the other four days a fee of 25 cents is charged. In 1899-1900 it was visited by 577,421 persons, 17,995 of whom paid. (In 1898-99 there were 40,491 who paid, because of a separate exhibition which drew a good many.) The greatest number on any one day (Sunday) was 10,759; the smallest, 54, on a pay day. This large number of visitors is very remarkable, for the great Field Columbian Museum in the same city had in 1899-1900 only 266,899 (in 1898-99 even less, 223,304), chiefly, indeed, because of its distant location. In New York, with double the population, the Metropolitan Museum in 1899 had 540,000 visitors, and the American Museum of Natural History had, in 1900, 523,522.^b The reasons for this lie, first, in the favorable location of the art institute, near the heart of the city, and then in the excellent and instructive installation and labeling of the entire collection (quite a contrast to the New York Art Museum), and perhaps, also, in the active and aspiring spirit of the inhabitants of Chicago. Besides, the frequent temporary exhibitions attract a considerable attendance, an arrangement adopted either not at all or only to a limited extent by the museums which I have compared above. There are also comprised in the total number 20,000 persons who attended the lectures, and 80,000 represent art school students who are counted each day; but in any case this comparatively lively interest which the people take must afford just satisfaction to the men who have devoted their time and their means to advance the interests of the art institute.

The collection of sculpture appears, from the catalogue of "sculpture and painting," of September, 1898, to consist of 632 numbers, almost all of which are casts. Modern sculptors are also represented—for instance, Barrias, Bartlett, Barye, Cain, Chapu, Daillion, Delaplanche, Donoghue, Dubois, Elwell, Ericksson, Falguière, Frémiet, French, Gelert, Gérôme, Hasselberg, Houdon, Idrac, Joy, Massouille, Mercié, Molin, Peterson, Potter, Rodin, St. Gaudens, St. Marceaux, Thornycroft, Tilden, Wuertz, and others,^c three of these with originals. In 1893 the French Government sent to the Chicago Exposition an extensive historical collection of architectural casts, unique of its kind, which was assigned to the art institute. It will be exhibited in its entirety in hall No. 20 when that is completed. I will also mention 109 facsimiles in bronze, after originals in the Naples Museum, from Pompeii and Herculaneum, which were also sent to the exposition; Grecian, Roman, and Egyptian antiques, among the last a most rich

^a"It is the earnest wish of the trustees that every man, woman, and child in Chicago should enjoy the educational advantages afforded by the institute, and for this object the galleries are open free on Wednesday, Saturday, and Sunday." The institute has the declared purpose of serving the people.

^bThe British Museum had in 1900 only 689,249 visitors (43,892 on Sundays), with a population in London of about 5,000,000; the Museum of Natural History had only 485,288; and the South Kensington Museum 846,489 (87,854 on Sundays).

^cOnly two of those named are represented in the Dresden sculpture gallery.



ART INSTITUTE OF CHICAGO.
Picture gallery on first floor.

and extensive collection of scarabæi, also a large collection of nephrites,^a 117 in number (Plate 23), which is, perhaps, only excelled by the collection of Mr. Bishop in the Metropolitan Museum of Art in New York City. Industrial arts are also notably represented.

The principal attraction of the museum, however, is the gallery of paintings, with some 500 pictures by over 300 artists, part of which, indeed, are only lent, but most of them will later become the property of the institute. Among them are several pictures for which the former owners paid \$30,000 to \$40,000, and many for which \$10,000 to \$20,000 were paid, almost all being large gifts or legacies. While with us most collectors sell their pictures already during their lifetime, or their heirs do it after their death, the rich Americans take pride in bequeathing theirs to a public institution.

The modern portion of the collection, especially pictures of the School of Fountainebleau, has hardly its equal in Europe, only the New York collections (see pp. 345, 350) being comparable with it. Of French artists there are exhibited Benjamin-Constant, Besnard, Rosa Bonheur (3), Bonnat, Bouguereau (3), Jules Breton (6), Cabanel, Cazin (6), Corot (8), Courbet, Couture, Daubigny (7), Decamps (3), Degas, Delacroix (4), Detaille, Diaz (8), Jules Dupré (9), Fragonard, Fromentin (3), Gérôme (2), Greuze, Gudín, Hébert, Henner (2), Isabey (2), Jacques (4), Lhermitte (3), van Marcke, Meissonier (2), Michel, Millet (3), Monet, de Neuville (3), Puvis de Chavannes, Robert, Rousseau (5), Roybet, Troyon (9), Ziem, and 31 other masters.

Of American artists I will name (partly represented by free-hand drawings, etchings, etc.,) Abbey (2), Bierstadt, Blum (3), Bridgman (2), Bristol, Bursh (2), H. and W. Chase (3), Church (5), Thomas Cole, Cox, Dannat, Charles Davis, Durand, Elliott, Fuller, Gibson, Gifford, de Haas, Thomas A. and B. Harrison, Hart, Hitchcock, G. Inness (8), G. Inness, jr.; Kappes (2), Leutze, Lungren, Martin, Murphy, Neal, Parsons (4), Pearce, Pennell (4), Reinhart (3), Richards, Sargent, Shirlaw (5), Stuart, Thayer, Vedder, Weeks, and J. A. M. Whistler.^b

Among the recent painters of other nations that are exhibited (partly in free-hand drawings) are the following: A. and O. Achenbach, Brozik, Chierici, Constable (2), Fortuny y Carbo, Gainsborough, Grützner (2), Israels (2), Jettel (3), Knaus, Koekkoek (4), Lawrence, Lenbach

^aThis collection was presented in 1900, together with oil paintings, water colors, porcelains, crystals, etc., 1,300 objects in all, valued at \$300,000. See the catalogue of The Nickerson Collection, 147 pages, with over 1,000 numbers.

^bThe American artists are treated by R. Muther in his *Geschichte der Malerei im XIX Jahrhundert*, III, 1894, pp. 366-405. He makes much use therein of R. Koehler's article in *Kunst für Alle*, 8th year, 1893, pp. 225, 241, and 257: *Die Entwicklung der Schönen Künste in den Vereinigten Staaten von Nordamerika*, and closes with the words, "America, therefore, has an art. * * * The American artists are the most modern of the moderns." Except in art circles very little is known among us of these things in America.

(free-hand drawing), Makart, Makovsky, Max (3), Meyer von Bremen, Michetti, Mücke, Munkácsy (3), Pasini (3), Pettenkofen, Reynolds (2), Schödl, Schreyer, Velten, Verboeckhoven (5), Wahlberg, Webb, Wenglein, Zimmermann.

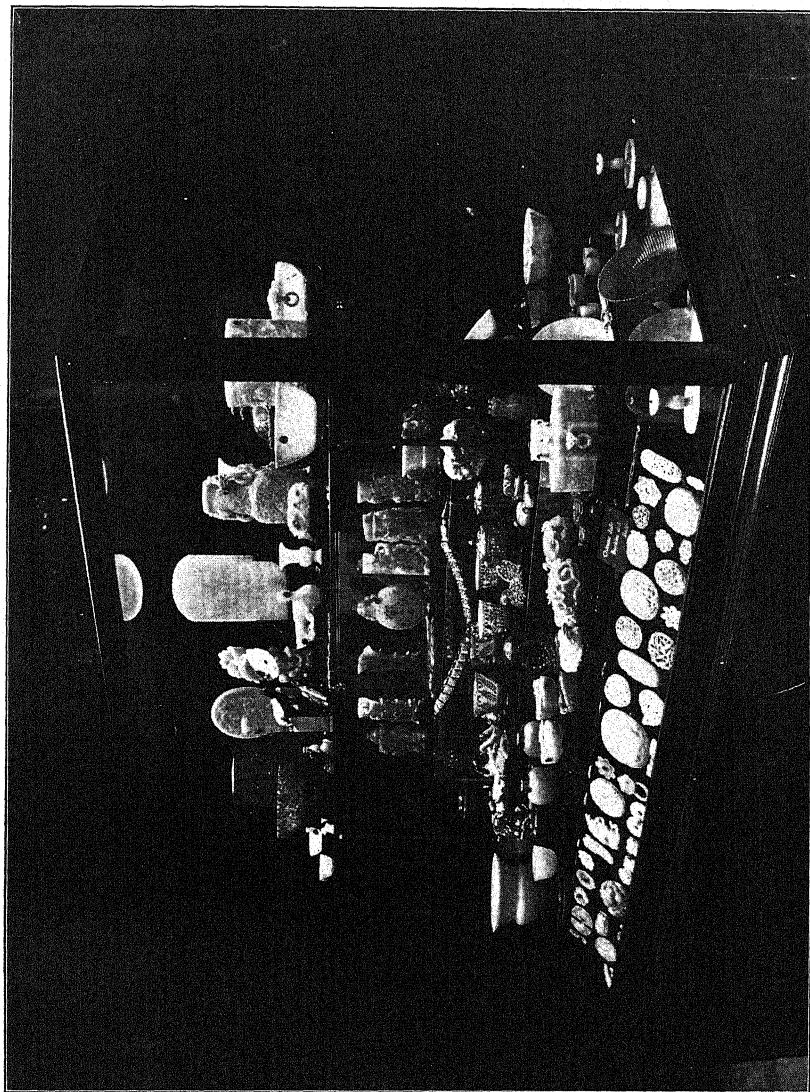
The collection of old masters is certainly not large, as indeed lies in the very nature of things, but it is worthy of attention. From the Demidoff auction in 1880 13 selected pieces, mostly of the Dutch school, were withdrawn, which in 1890 the art institute was able to buy; these were portraits of Rembrandt, Rubens, van Dyck, Franz Hals the elder, and Holbein, the Guitar Lesson of Ter Borch, a Family Concert of Jan Steen, an excellent landscape of Hobbema, the Jubilee of Ostade, as well as pictures of Teniers the younger, Ruysdael and A. and W. van de Velde. There are also examples of L. and H. Backhuysen, Berchem, Brueghel the elder, van Croos, Aelbert Cuyp, Fouquières, Frans Francken the younger, Ghirlandajo, van Goyen, Guardi, de Keyser, W. van Mieris, Mor, Murillo (2), A. van der Neer, Perugino (4), Rembrandt, H. Saft-Leven, Sorgh (2), Teniers the younger (2), Ter Borch, Titian, P. Veronese (2), Wouwerman.

I have given this enumeration somewhat at length for the reason that in Europe, even in art circles, we are hardly at all aware that Chicago can show so much in this field.

Besides this permanent collection the art institute holds yearly, in addition to exhibits of single fine pictures from private collections and school exhibits, a considerable number of temporary exhibitions (23 in 1900) for which catalogues are issued, distinguished by their tasteful appearance, the following, among the more recent, for example: Catalogue of the Thirteenth Annual Exhibition of Oil Paintings and Sculpture by American Artists, October 30 to December 9, 1900 (281 numbers, 48 pages); Catalogue of a Loan Exhibition of Selected Works of Modern Masters, January 8 to 27, 1901 (63 numbers, 24 pages, among them a series of eminent masterpieces such as it would hardly be possible to get together in Dresden); Catalogue of an Exhibition of Works by Chicago Artists, January 31 to February 24, 1901 (198 numbers, 40 pages); Catalogue of Works of Dagnan-Bouveret, March 1-24, 1901 (29 numbers, 16 pages); Exhibition of Works of Elihu Vedder, March 28 to April 15, 1901 (49 numbers, 24 pages); Catalogue of the Thirteenth Annual Exhibition of Water Colors, Pastels, and Miniatures by American Artists, April 25 to June 9, 1901 (376 numbers, 51 pages), and others.

The library contains only 2,263 volumes, but including, however, many expensive works, besides over 16,000 of the large Braun autotypes. It is open daily, except on Sundays and holidays, from 9 a. m. to 5 p. m.; on three days also until 7 p. m. for the accommodation of the pupils of the art school.

In 1900 there were given in the lecture hall for members and their



ART INSTITUTE OF CHICAGO.
Exhibit of jade objects.

friends 90 lectures on art, also on music with musical performances; besides 41 lectures for the art students and 24 for other art associations.

I will briefly mention the art school. It is one of the most frequented in the United States. In 1900 it had over 1,900 students, 740 regular day students, 500 evening students, 794 Saturday students. In the day classes in 1899 there were 25 teachers, including prominent persons from without, whose services were temporarily secured, 10 in the evening classes and 35 students, who received a total compensation of \$29,000. The models cost \$3,000, heating and lighting \$1,750 (see also Circular of Instruction of the School of Drawing, Painting, Modeling, Decorative, Designing, and Architecture, 1900-1901, 191 pages, with many illustrations, 1900).

It is estimated that the collections of paintings, sculptures, antiquities, and other objects of art belonging to the art institute are of the value of about \$850,000. The cost of the building has been \$708,000. The land, 400 feet, estimated on the basis of the property opposite, on Michigan avenue, is worth not less than \$1,600,000, a total of \$3,158,000. The loan collections constantly exhibited are probably of the value of \$300,000. The total amount of cash subscriptions paid into the Art Institute since its organization in 1879 is about \$500,000.

It is, in fact, admirable and worthy of respect, that so important a work as that achieved and presented by the Chicago Art Institute should have been accomplished without great, private benefactions—I mean “great” in the American sense, as they are made to other institutions in America^a—and without aid from the State or city; and it is difficult, for us at least, to understand why the city, as such, is not sufficiently ambitious to feel it a duty to support an art society that has already attained so high a rank, in order that it may compete with the first in the world. We can only suppose that the city fathers do not appreciate the educational worth of art.

In one of the last annual reports it is said, “The Art Institute has accomplished something; it aspires to accomplish much more.” The present beautiful product is regarded only as the beginning of a greater one, and they are already thinking of either adding lateral wings or of bridging over the railroad and erecting a second building in the park beyond, nearer the edge of the lake. Who, indeed, who has learned on the spot to know and admire the enterprising spirit of Chicago, can have the least doubt but that the future development will go far beyond such plans?

13. JOHN CRERAR LIBRARY.

The history of this library is as simple as it is unusual and brief. In 1886 John Crerar, a merchant who had lived in Chicago since 1862,^b

^a For example, the Metropolitan Museum of Art in New York recently obtained a legacy of \$8,000,000.

^b Of Scotch extraction, born in New York. See Appleton's *Cyclopedia of American Biography*, new edition; also M. Kirkland's *History of Chicago*, 1895, and Will of John Crerar, who died in Chicago, October 19, 1889, 23 pages.

bequeathed the greater part of his property, after deducting numerous private and public legacies,^a for founding a "free public library" in the southern part of the city, as the northern part was already provided with such an one in the Newberry Library (see p. 459). He desired the erection of a tasteful, solid, fireproof building. Only such books and journals were to be included as might create and sustain a healthy moral and Christian sentiment in the community; all offensive and immoral works were to be excluded. Concerning such books, he said:

I do not mean by this that there shall not be anything but hymn books and sermons, but I mean that dirty French novels and all skeptical trash and works of questionable moral tone shall never be found in this library. I want its atmosphere that of Christian refinement, and its aim and object the building up of character.

In 1889 the excellent man died. In 1894 the library was incorporated by the State, in 1895 organized, and in 1897 opened. I said above that its history is short, but it nevertheless contains much that is instructive and worth noting.

The testator himself had named thirteen of his friends as "directors," two of whom were his executors. They cooperated with the other principal libraries in Chicago so that the Crerar Library was to give special attention to the natural sciences exclusive of medicine, to the social sciences, and technology; the Newberry (see p. 459) to medicine, history, art, and the humanities; the university (see p. 491) to philology, and the Public Library (see p. 473) to the whole, more popular literature for household reading. The idea that by a cooperative division of this sort the institutions above named would attain the greatest possible use for the general good is as wise as it is rare, and will certainly be productive of the most excellent results. The exact programme of the Crerar Library is as follows:

I. *General works*.—Bibliography, library economy, cyclopedias, general periodicals, general societies, exhibitions and museums, psychology, logic, history and geography, cartography.

II. *Social sciences*.—Ethics, statistics, political science, political economy, administration (including public documents), associations and institutions, education, commerce and communication, customs, folklore, etc.

III. *Physical sciences*.—Mathematics, astronomy, physics, chemistry, and mineralogy.

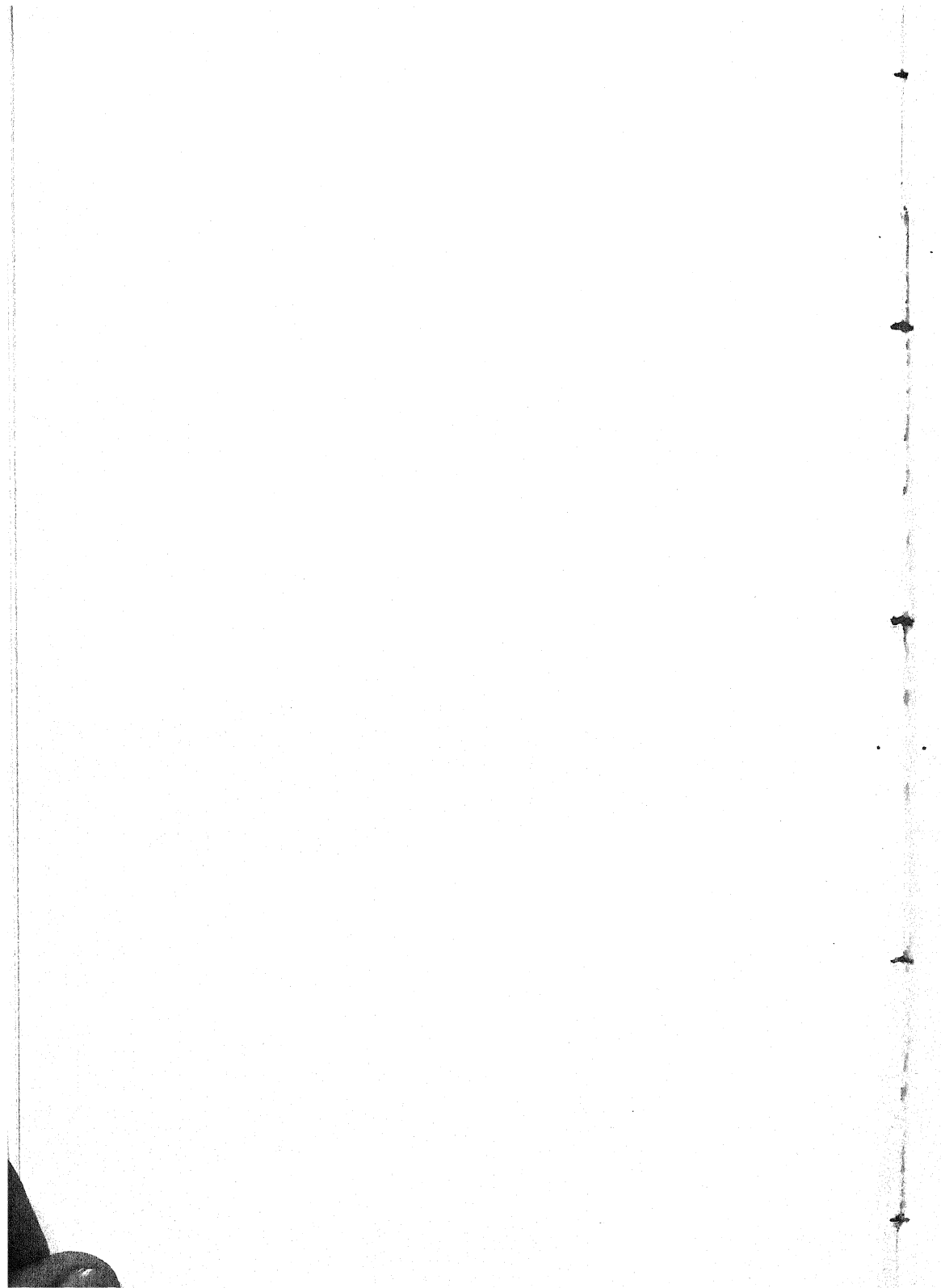
IV. *Natural sciences*.—Geology, paleontology, biology, botany, zoology.

^aThe last-named legacies amounted to \$1,000,000 for ecclesiastical, benevolent, and educational purposes, among which were \$100,000 for a Lincoln statue, and \$25,000 for the Chicago Historical Society (see p. 439). The will was contested by the relatives, but without result, concerning which a series of papers, some of which were quite extensive, were published in 1892.



JOHN CRERAR LIBRARY.

Chicago, Illinois.



V. *Applied sciences*.—Engineering, agriculture, domestic economy, trade and transportation, chemical technology, manufactures and trades, building, landscape gardening, architecture, drawing, designing, etc., photography.^a

It was concluded, awaiting the time when sufficient capital should be collected to admit of building a house, to rent quarters, and very suitable ones were found in one of the many great business houses in the heart of the city. There was chosen the sixth story of a new addition to the wholesale house of Marshall Field & Co.,^b near the principal business centers, the public library, and the art institute.

Recently (in 1900) a portion of the fifth story was added. The nine-storied building, designed by the architect D. H. Burnham in 1893 (Plate 24), is a vast rectangle 148 feet long and 100 feet wide, with an inner court. The entire floor was specially fitted in an extremely convenient manner for the John Crerar Library by the architects Shepley, Rutan & Coolidge, who designed the art institute and the public library. The reading room (Plate 25), looking toward the east, is 85 feet long by 50 feet wide and has 75 seats; the principal library hall (Plate 26) is 88 feet long by 42 feet wide and looks toward the south. The inner court being of too small dimensions (72 by 40 feet) for the height of the

^a The complete scheme has under these 5 divisions 77 subdivisions instead of the 39 here mentioned. It is based on the Dewey decimal system.

^b The proprietor of this vast business is Mr. Marshall Field, the Mæcenas of the Field Columbian Museum, which bears his name (see p. 410), and one of the Mæcenates of the University of Chicago (see p. 491). The house carries on a retail and a wholesale business, the latter in an enormous building in Adams street, made after the plans of Richardson with striking architectural features, the former on a corner of State and Washington streets, the new building in which the Crerar Library is installed and which is connected with the old building, being on the corner of Washington street and Wabash avenue. In the wholesale department 5,000 persons are employed; in the retail bazaar 4,000, which number, after the completion of a second new building, is to be increased by 2,000. The fittings and furniture of the rooms are prominent, the mahogany cases are of the best make; order and neatness prevail. The building is fireproof, with external iron shutters except for the ground floor. One may judge of the refinement that rules here by the fact that extra articles of food for diabetics can be found on the tastefully designed menu card of the lunch room which is frequented by hundreds of persons and open daily from 8.30 to 5 o'clock, and where both hot and cold articles of food can be obtained (there are more than 150 dishes and nonalcoholic beverages, from 5 cents to 40 cents). At the present time the firm is erecting on the corner of State and Randolph streets, adjoining the old building, corner of State and Washington streets, after the design of the Architect Graham, a palace of 12 stories out of white granite, so that the State street front of the establishment will be 425 long. This front will be ornamented with granite Ionic pillars from 30 to 70 feet high, and the vestibule will be lined with Carrara marble. The cost will reach \$1,500,000. Everything will be fitted up with the most recent improvements. [Now completed, 1903.] During my visit in 1899 the firm had half of the street in front of the house (about 38 feet broad) asphalted at its own expense, because the pavement, as is usual in Chicago, was bad and the city would do nothing. Marshall Field & Co. wished in this way to give an example for the emulation of others and also to remind the officials of their duty.

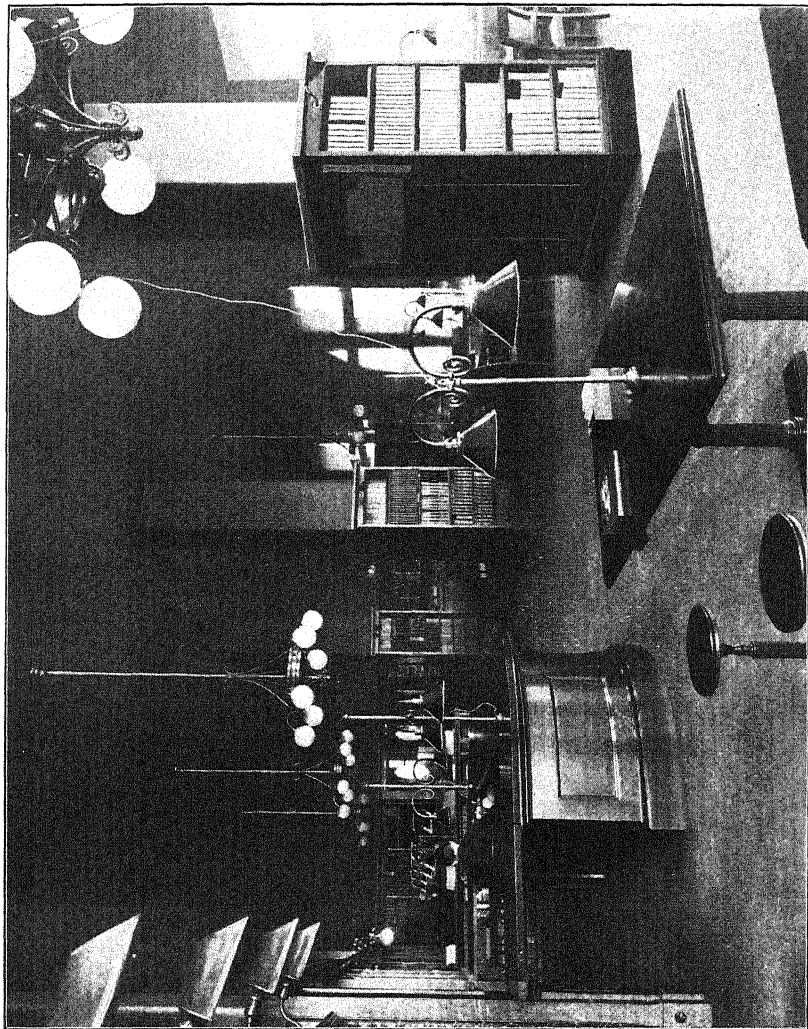
building, which was planned for other purposes, the lighting is not in all parts sufficient. Including the rooms in the fifth story there are accommodations for 135,000 books. It would be a mistake to suppose that the elevated situation of the sixth story makes it difficult of access, for there are three elevators in operation^a by which the sixth floor can be reached sooner than by climbing the stairway even to the second floor. The building is fireproof and, like many American houses, has fire-escape ladders on the outside; within only extinguishers are used for security. The floors are covered with cork linoleum of the best quality, about a third of an inch thick. The house furnishes steam heat and electric light. There is no special arrangement for ventilation,^b the high rooms, large windows, and elevator shafts sufficing to change the air. In a later building it is proposed to seal the windows hermetically and to force in filtered and purified air, a system now applied in many places, as in the Congressional Library at Washington, and of which I shall speak more fully under the Public Library of Chicago. Recently there has been established a small auditorium for 30 persons, which can also be used by scientific societies, such as the Bibliographical Society, the Entomological Society, the Mycological Society, the Illinois Association of Public Accountants, and the Institute of Education. There is a special lunch room for employees.

The book stacks are of iron, the other furniture of wood. In spite of the excellent examples in Boston, New York, and elsewhere, and notwithstanding the rigorous application of this principle in the Chicago Historical Society (see p. 439), wooden furniture has been employed, and this will always offer a point of attack for fire. The iron book stacks, as well as most of the wooden library furniture, were furnished by the Library Bureau of Boston, a grand institution which I hope to be able to describe in the course of my reports. Their model for book stacks, however, is not as satisfactory as many others (see p. 382). It is less stable and the ends are overornamented, creating a bad impression when a number are taken together. The shelves are of white wood veneered with oak, instead of iron. The newer racks in the fifth story are, as I have recently been informed, steadier, less ornamented, and smoother, whereby the books are less liable to injury. A practical form of book support^c is used to prevent

^aThere is also one for freight. Two of the three passenger elevators go directly to the John Crerar Library, without stopping at the intervening floors; they are the so-called "express trains."

^bExcept that in the window frames of the reading room there is provided a small ventilating apparatus which the American Ventilator Company has patented and called the "sash ventilator and lifter combined." It consists essentially of perforating the lower window frame with holes through which air may enter if it is desired.

^cFurnished by John Joseph McVey, publisher, etc., 39 North Thirteenth street, Philadelphia. Cost, \$10 a hundred. This firm also makes another kind of book support with label holders,



JOHN CRERAR LIBRARY.
Reading room.

the books falling down when the shelf is not full. The vertical arm has two rounded wings standing out at right angles to it. When books are quickly put up these prevent the thin plate from passing between the book leaves and injuring them, as often occurs when other kinds of supports are used. If an employee of the library takes a book from a case for his own temporary use he puts a red card in its place; the books that are given out to the public are recorded only in the office.

The library now contains 70,000 volumes. The normal yearly increase has hitherto been about 10,000 volumes. In 1900 there were of general works, 13,590; social sciences, 16,106; physical sciences, 10,380; natural sciences, 9,134, and applied sciences, 16,435. It may be remarked that the 14 per cent devoted to the natural sciences cost three times as much as did the 24 per cent devoted to the social sciences. According to the agreement which was previously mentioned there were bought from the Newberry Library 8,023 volumes on natural science for \$16,000, besides 300 special ornithological works for \$4,500.

The library is catalogued according to the rules of Linderfelt^a and classified according to the system of Dewey,^b with independent amplifications. The lettering and the numbering are printed with gold directly upon the backs of the books. The greatest care has been given in the selection of bindings, and the edges of many volumes are gilded in order that they may be more easily cleaned in the dusty and sooty atmosphere of the center of the city. Pamphlets are simply bound and provisionally kept in cases. In 1900 there were 5,431 volumes bound at a cost of \$5,570, or at an average of about \$1.19 a volume. The printed card catalogue, directly accessible to the public, contained in 1900 over 90,000 cards, 41,000 of them author cards and 49,000 subject cards, among which were also a small number of those published by the American Library Association.^c There are also about 30,000 cards to which are added bibliographical information—from the Concilium Bibliographicum in Zürich, from the American Library Association, from the Torrey Botanical Club, from the Department of Agriculture in Washington, from the Bibliographie des Sciences Mathématiques in Brussels, and some others. This bibliographic information, accordingly, relates to zoology, agriculture, American botanical literature, names of new botanical genera and species, math-

^a K. A. Linderfelt. *Eclectic Card Catalogue Rules*. Boston, 1890.

^b M. Dewey. *Decimal Classification, etc.*, 5th ed., Boston, 1894. See also p. 399 of this paper.

^c These relate to 250 scientific societies, institutes, and periodicals which, by division of labor, are written by the John Crerar Library, the New York Public Library, the Boston Athenæum, the Harvard University Library in Cambridge, and the Columbia University Library in New York. The John Crerar Library includes however in its card catalogue only such of the cards as relate to the books and pamphlets in its possession.

ematics, and photography. The card catalogue proper of the John Crerar Library is distinguished by its exact and beautiful execution and by the originality of its arrangement, which is said to be unique of its kind. It is arranged in three parts: (1) alphabetically, according to authors and titles; (2) according to subjects, numerically in the decimal classification, and at the same time chronologically; (3) an alphabetical subject index to No. 2.^a Twenty copies of the cards are printed, for besides their use for the various catalogues, sets are sent gratis to the Armour Institute of Technology, the Public Library, the Field Columbian Museum, the Newberry Library,^b and the University of Chicago, also to the Northwestern University, in Evanston, Illinois, and the University of Illinois, in Champaign, Illinois, under the condition that they shall be arranged and made accessible to the public. Each title costs the John Crerar Library 50 cents, including the electrotype. (See below.) The regular issue of special catalogues is planned and has been begun with a list of the library placed in the reading room (*A List of Books in the Reading Room*, January, 1900, 251 pages, Lex., octavo). In the reading room are about 3,000 volumes. The printing of this catalogue was made from electrotypes. From the type setting of the card is formed a thin cast, which costs 6 cents. These casts, numbering 23,354 in 1900, are preserved in regular order, and in their prescribed serial order,^c are used for printing. In this way both manuscript and corrections are spared. This catalogue must be the very first book to be produced in this manner, a plan which was suggested half a century ago by C. C. Jewett, the librarian of the Smithsonian Institution in Washington, who proposed that a central catalogue bureau should make such casts, from which every library could print their own cata-

^aSee, for more exact information, the Second Annual Report of the John Crerar Library, 1896, p. 10 (1897), also the Third Report, 1897, p. 18 (1898). The library also has a fourth kind of card catalogue, the so-called "official catalog" for the employees, which contains in one alphabet everything that concerns any work that is extant or taken into consideration, including notices of it, etc., a complicated, ingenious, and very useful device, a more detailed description of which I do not give here. A "dictionary catalog," that is to say, one in which everything is arranged alphabetically according to authors and subjects as in a dictionary, is not provided. Compare C. A. Cutter, *Rules for a Dictionary Catalogue*, 3d ed., Washington, 1891 (U. S. Bureau of Education. Special Report on Public Libraries, Pt. 2.).

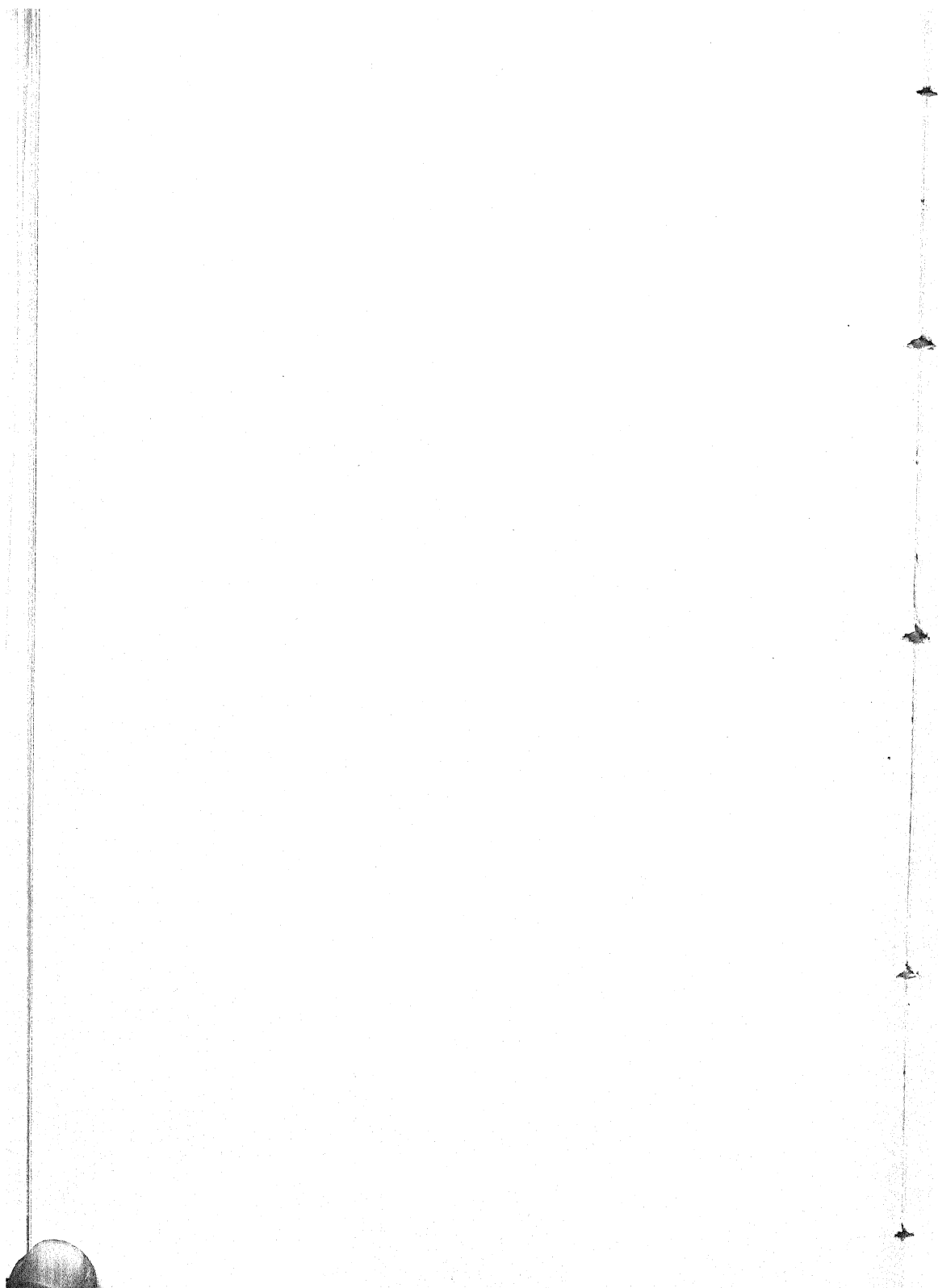
^bThe Newberry Library has recently declined to receive them, perhaps because the arrangement and care of 6,000 cards annually occasioned too great an expense considering the slight use made of them by the public, or because their size did not fit their "indexer," to which I shall recur below. The six other libraries, however, upon inquiry, desired to continue to receive them.

^cC. W. Andrews. *Printed Card Catalogues*. Transactions and Proceedings of the Second International Library Conference. London, 1897 (1898), pp. 126-128. See also F. Milkau's more detailed description in *Centralkataloge und Titeldrucke*, 1898, p. 99.



JOHN CRERAR LIBRARY.

Book stacks.



logue.^a The printing is finely executed. Electrotyping is cheaper than printing.^b A page costs a little over a dollar, or with a large edition it is reduced to about 55 cents. The titles are arranged systematically in 9 divisions and 67 subdivisions; within these, however, they are also systematically, not alphabetically, arranged. The alphabetical index at the end, with 2,000 entries, contains, beside authors, also certain titles. The catalogue is sold in the library for a nominal price of 20 cents; by mail, 30 cents. There are also printed six instructive reports, distinguished among similar publications for their clearness and completeness; a list of current periodicals, 1897, 20 pages, linotyped; the by-laws of the library, 1898, 14 pages, and a few circulars. In 1900 the library received 2,017 periodicals, at an expenditure for subscriptions of \$4,261.27 (396 were presented).^c In accordance with its programme it offers an unusually rich collection of scientific journals and publications of learned societies. The entry book for these is very practically arranged.

The library is opened on week days from 9 a. m. till 10 p. m., and is closed on Sundays. The books in the reading room may be consulted without formality by anyone, but after use are to be left on the tables. The current periodicals may be consulted in the periodical department or obtained for use in the reading room, like the books, by putting in a card for them. These are returned, after use, to the desk. The arrangement, according to the Dewey system, is such a practical one that on the average only a minute and thirty-eight seconds are required to place any book in the hands of the person asking for it. Books are lent out only in extraordinary cases, and then for but a short time, and only such books as are seldom called for. In case of special researches certain persons personally known to the director are allowed to take the books directly from the stacks. For that purpose permanent passes are issued. In 1900, 42 persons had such passes, and 32 used them 287 times. Besides, there were issued 730 single permissions to take books directly from the shelves. These books must be left lying upon the tables. Everything is recorded exactly, so that not only is the number of books used known, but also to what particular divisions they belong. In 1900 over 95,000 volumes and periodicals were used. Very valuable and rare books may be consulted only in the presence of an attendant. The tracing of plans, etc., is allowed only on celluloid tablets, which can be obtained in the library.

As is everywhere evident, it is the one endeavor of the administration to make the library as useful as possible. A greater liberality than is here practiced can not be imagined, and it gives great satisfaction to

^aSee Milkau, *Centralkataloge und Titeldrucke*, 1898, p. 27.

^bSixth Report, 1900, p. 16, 1901.

^cIn 1899 there were 1,806, and of these 416 were general, 499 related to social sciences, 501 to natural sciences, and 480 to applied sciences.

know that, notwithstanding the absence of all such obstructions as are usually employed in Europe, the library since its foundation has lost only 14 volumes, and some of these, moreover, may yet be found, for an English library has recently reported the return of a volume that had been missing for forty-five years.^a During the year 1900, 41,697 persons used the library, more than 20 per cent of them women; that is to say, an average of 134 daily (maximum 282, minimum 35). The daily average of evening visitors from 5 to 10 o'clock was 30. Order cards to the number of 32,653 were issued.

There are 28 employees, 10 of whom are women—5 librarians, 1 treasurer (and secretary), 13 assistants, 4 attendants, 3 pages, and 2 janitors. The hours of service in summer are from 9 a. m. to 5 p. m.; in winter till 5.30 p. m., with an hour for luncheon. From 5 to 10 in the evening another shift of employees comes on.

While the chief librarian is the actual leader and soul of the whole, the institution is controlled by a board of 13 directors, who from their own number choose a president, 2 vice-presidents, and a secretary. The directors, excepting the president, are also formed into four committees of 3 persons each, on finance, administration, buildings and grounds, and books.

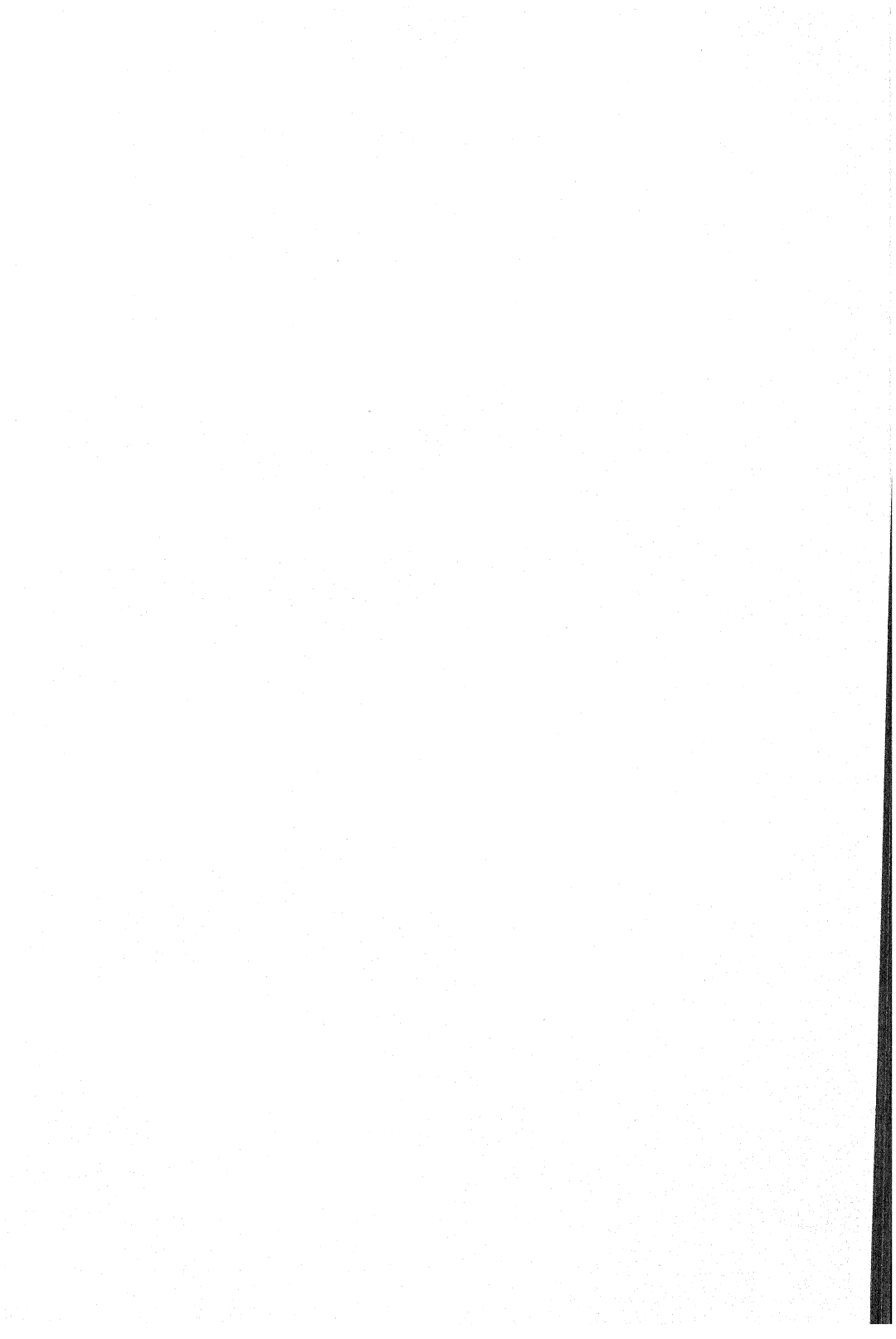
The resources of the John Crerar Library, on the interest of which it is supported, in 1900 were \$3,400,000; the reserved building fund is \$319,000; the reserve book fund, \$131,000, and besides there is a security reserve fund of \$16,200. The assets are, therefore, almost \$4,000,000. When the building fund reaches the necessary sum the erection of a special building will be taken up. Quite recently the chances for this have been much improved, and there is now a prospect for obtaining a favorable building site.^b The financial course has been very sound from the beginning. It was determined that the capital should never be touched, neither for the purchase of a site, for the structure itself, nor for anything else whatever, but that all expenditures should be made entirely from the interests of the funded, bequeathed capital.

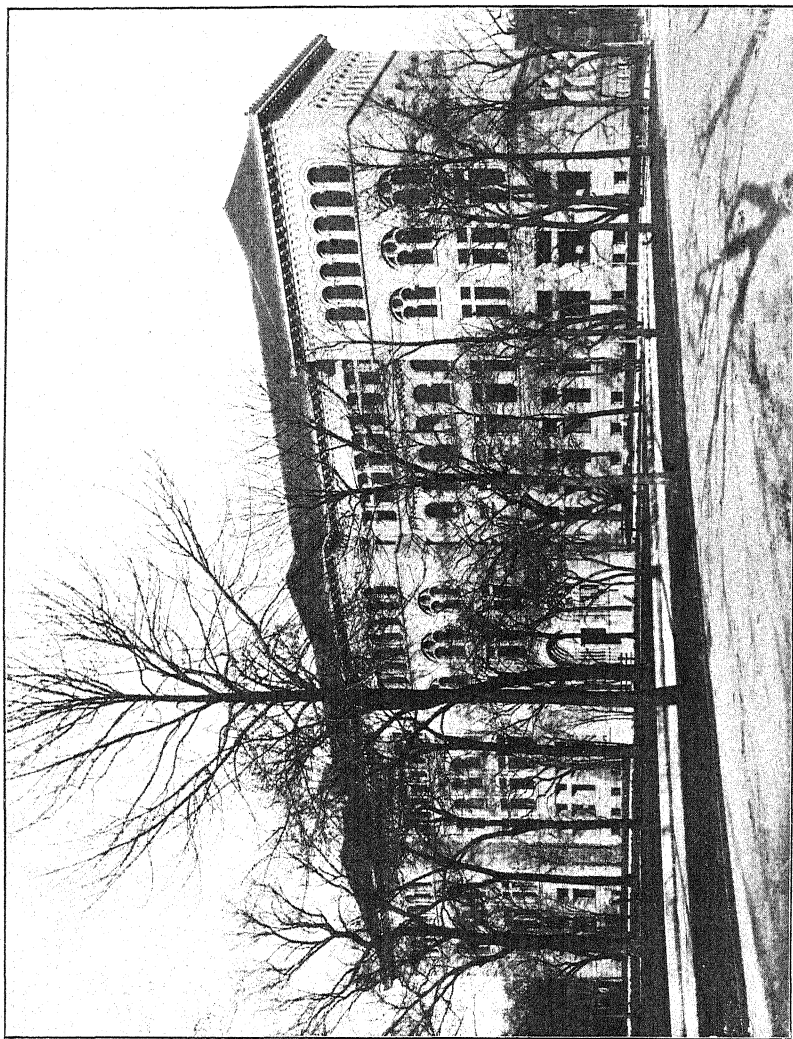
The expenditures in 1899 were for rent, light, etc., \$13,331; salaries and wages, \$25,006; printing, \$2,303; books, \$17,587; periodicals, \$4,468; binding, lettering, repairs, \$8,403; miscellaneous, \$6,895, making a total of \$77,994. As, however, the income from the interest reached \$139,944, \$61,950 could be applied to the building fund. The library is insured for \$107,000.

The organization of the John Crerar Library is as exemplary as it is original. The library is, with the exception of those of the universities, one of the few purely scientific libraries in the United States. With its great wealth and its wisely restricted policy it will doubtless

^a Fourth Annual Report of the John Crerar Library, 1898, p. 17, 1899.

^b The construction of a new building will soon begin, 1903.





NEWBERRY LIBRARY.
Chicago, Illinois.

in time advance to a high rank and by the liberal principles of its administration become of great use. We may well be anxious to know how its librarian, Mr. C. W. Andrews, will solve the great problem of a new building after the many notable attempts in this line that have been made in the United States.

14. NEWBERRY LIBRARY.

This library, like the John Crerar Library, owes its existence to the generosity of a rich citizen of Chicago, Walter Loomis Newberry,^a who died in 1868. In a will made in 1866^b he left half of his property after the death of the direct heirs for a "free public library" in the northern part of the city, and directed his two trustees to use a portion of the bequest for buildings, but to invest the remainder as they might think proper "for the growth, preservation, permanence, and general usefulness of such library." After the direct heirs died in 1885, the property in question amounted to over \$2,000,000,^c and in 1887 there was \$67,778 income available, so that steps could be taken toward its foundation. The two trustees took counsel with some other gentlemen, and it was decided to establish a reference library whose books should not be lent out—like the John Crerar Library, which has adopted that plan—as distinguished from a circulating library from which the books may be taken out. In the same year the erection of a temporary building on the site of the testator's residence in the northern part of the city was taken in hand, some rooms were rented for immediate use, and there was appointed a librarian, W. F. Poole, who for fourteen years had occupied a similar position in the public library of Chicago and was one of the leading librarians of America (among other things he founded in 1853 the *Index to Periodical Literature* which is still continued), and two other employees. Forty thousand dollars was appropriated for books and pamphlets. In the spring of 1888 some 14,000 volumes were installed in the provisional building, and the library was opened to the public.

At the beginning of 1890 a removal was made to another provisional building not far from the first one and near the site on which it was intended to build the final structure. This was a one-storied, fireproof

^a W. L. Newberry, born in 1804; his ancestors came from England to America in 1630. He lived subsequent to 1833 as a banker in Chicago, possessed a fine library, belonged among others to the Chicago Board of Education, and was president of the Historical Society. From 1857, because of his health, he spent every winter in southern France. Not only is he renowned for his own magnificent benefaction which keeps his memory permanently green; but his example induced the foundation of the John Crerar Library in another part of the city (see p. 451).

^b See *The Newberry Library, Chicago. Certificate of Incorporation and Incorporation Act*, p. 13 (27 pp.).

^c Already in 1894 it had increased to \$6,000,000, and as a great portion of it is invested in houses and lots it is continually rising in value.

house, built for the purpose, 175 feet long by 65 feet wide, capable of holding 200,000 volumes. The transfer of over 90,000 books, pamphlets, etc., was completed in a week. The building contained an auditorium in which up to the year 1892 42 lectures had been given to audiences varying from 220 to 550 persons, under the auspices of an association that had been formed with the name the Newberry Library Center for University Extension. In the same year the library, then managed by a single surviving trustee, was incorporated by the State under the name of the Newberry Library, and the trustee mentioned nominated a board of 13 trustees that had the power to elect its own president. Eleven of these first trustees or directors still retain their office. They are all men of wealth and prominence in the city, all are at the head of great affairs, some of them of international reputation. At the end of 1893 the new library building was ready, the transfer of over 150,000 books, pamphlets, etc., being completed in ten days.

The general plan for the building was already settled upon in 1888, as follows: It was to provide sufficient room to meet the demands of at least twenty-five years and to be so constructed that additions to the original plan could be built from time to time; it must avoid "the confessed errors of the conventional style, it must have the equipment of what is in the highest sense an educational institution—an audience room, reading rooms, study rooms, and every arrangement that would make the resources of the library available to those seeking its treasures. It must have also the conveniences for administration, for study, and for the storage of books, which the concurrent experience of modern times demands." This fine problem, conceived according to the ideas of W. F. Poole, was in 1888 confided to the architect, Henry Ives Cobb. In 1889 the site was selected, about one and a half acres, in a small park, midway between Lake and Lincoln parks, not far from the shore of the lake, in a region comparatively free from smoke and near a great artery of travel with an electric railway. The building, begun in 1890, required an expenditure of over \$500,000, which was defrayed from the accumulated interest and a part of the capital. The great structure is three-storied,^a built of pink Milford, Connecticut, granite and presents an imposing as well as a tasteful appearance, especially in summer, under the high old trees of Walton Place. The present structure, however, is only a third of the contemplated one, which is to form a great quadrangle with a court in the center. Internal convenience to a certain extent has been sacrificed to architectural beauty. The basement is 10 feet high, the first floor 20 feet, the second and third floors 26 feet each, and the fourth floor

^a In America it is called five-storied, as the basement and ground floor are each counted as a story, but often, also, as in this case, the ground floor is counted as the first story and the basement not included in the enumeration of stories.

15 feet. These heights so greatly exceed the heights of the book stacks, which are 7 feet 6 inches high, and which can be used without ladders, that a large free space remains above them, and the books are also lighted laterally from above. This has been done to give them "light and breathing space," but I am not aware that books suffer even in closed cases, and it contradicts the principles of modern library arrangement, according to which the books should be compressed into as narrow a space as possible, which, owing to the rapid increase of books in our prolific times, is the only possible method of preventing a too wide extension of the building. For this reason stacks are piled directly on stacks with hardly any free space between. Sufficient air

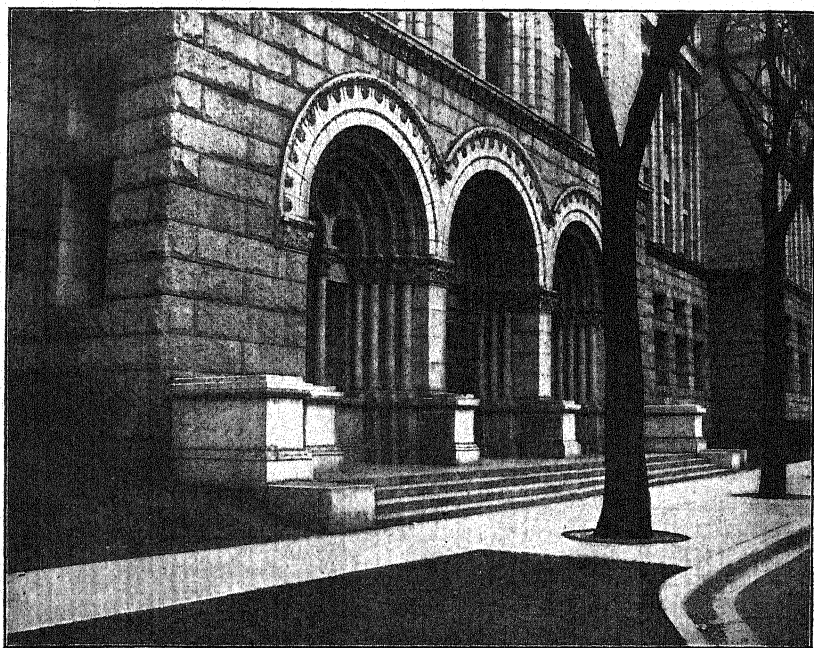


FIG. 47.—Newberry Library. Principal entrance.

for "breathing" is afforded by good ventilation, and the electric light to-day affords means of temporary illumination of the darkest corners, while the daylight, bleaching everything that it falls upon, can not be considered in any case as the most desirable. The book stacks are 10 inches deep.

In March, 1901, there were in the library 229,364 books, pamphlets (71,859), maps, manuscripts, etchings, and autographs (of which 56 per cent were in languages other than English), an average for the fourteen years of 16,000 numbers a year, so that at the end of 1901 there will be almost one-quarter of a million. The present building has room for 900,000; with the prospective later building there would

be room for 3,000,000, which, at the present rate of increase, would suffice for two hundred years, but with the modern arrangement of the book stacks, like those in the Congressional Library at Washington, for example, the building would certainly hold double that number, if not many more. The Newberry Library has therefore a chance for unchecked development in this direction.

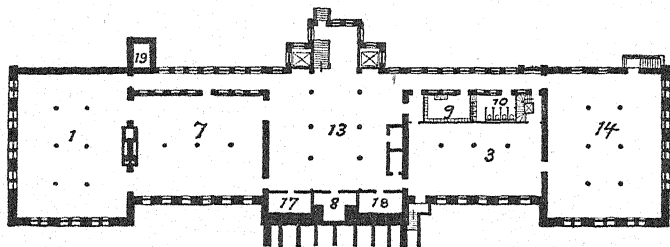


FIG. 48.—Newberry Library. Plan of basement.

1, duplicates (56 by 68 feet); 3, engine room (50 by 68 feet); 7, hall; 8, vault; 9, cloak room; 10, men's closet; 13, anteroom (36 by 66 feet); 14, storeroom (56 by 68 feet); 17 and 18, closets; 19, shaft.

The floor plans shown in figs. 48-52 give, with the legends, an idea of the arrangement of the rooms. Perhaps it would have been more judicious to have avoided the running of a corridor along the inner wall of the building, as it cuts off the light to the book rooms from this side and, besides, makes the access more difficult, but the halls, with their absolutely plain light decoration in greenish walls and white ceilings, and the antehalls, decorated with paintings and busts, make an excellent, charming, and pleasing impression, and they should undoubtedly be considered as very successful. The first story has a marble floor while the others are floored with reddish brown, unglazed,

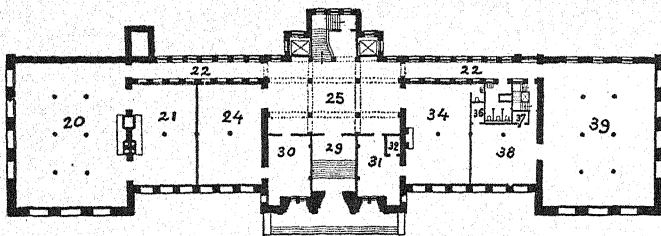


FIG. 49.—Newberry Library. Plan of first floor.

20 and 21, medicine; 22, corridor; 24, museum (33 by 52 feet); 25, hall; 29, vestibule; 30, check room (23 by 33 feet); 31, office (23 by 33 feet); 32, vault; 34, board room (33 by 50 feet); 36 and 37, closets; 38, chief librarian; 39, catalogue division.

encaustic tiles, which are made in Ohio and are half an inch thick; running carpets laid loose upon these present a somewhat unfinished appearance. The hard inelastic floors are very fatiguing for walking and standing, as is always the case in museums with uncovered stone floors. They should be covered with linoleum or corcaicin. Rooms closed off for the employees are not provided. They sit in the large

halls where they are not allowed to work unmolested. The machines and ventilators are set up in the basement, whereby injurious tremors and disturbing noises are occasioned in the building. The electric light is furnished by the Edison Company. The ventilation was at first so arranged that no air could enter through the windows, which were tightly screwed down, it being forced into the building already washed and purified. However, one "couldn't breathe there," so it is

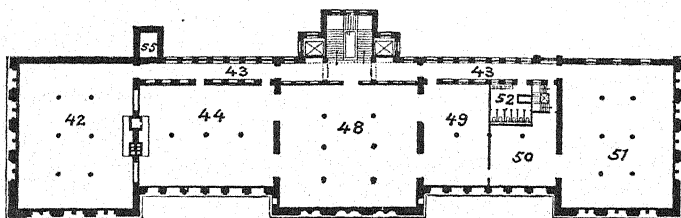


FIG. 50.—Newberry Library. Plan of second floor.

42, history (56 by 68 feet); 43, corridor; 44, philosophy (50 by 66 feet); 48, large reading room (50 by 68 feet); 49, bound periodicals (26 by 50 feet); 50, annex to art and literature (30 by 33 feet); 51, art and literature (56 by 68 feet); 52, women's closet; 55, shaft.

now ventilated by opening the windows, which have been altered for the purpose. The apparatus is either not rightly set up or not properly run, for similar ones are working satisfactorily in the Congressional Library at Washington and elsewhere. I shall speak more fully of this important subject when I treat of the public library (see p. 473). While the books could, with the ventilation that was designed, be kept free from dust or nearly so, now they are soiled without hindrance or require a greater expenditure for cleaning, and although the

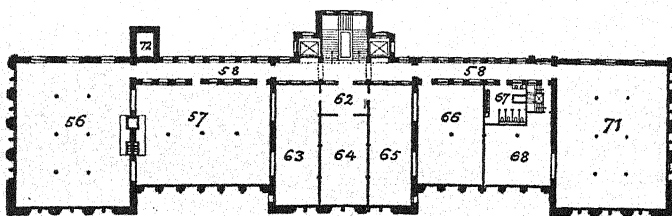


FIG. 51.—Newberry Library. Plan of third floor.

56, "Friday Club" (56 by 68 feet); 57, genealogy, music (50 by 62 feet); 58, corridor; 62, anteroom; 63 and 65, lecture rooms; 66, empty (33 by 50 feet); 67, men's closet; 68, lunch room; 71, natural sciences (56 by 68 feet); 72, shaft.

situation of the Newberry Library is not so unfavorable for soot and dust as that of the Crerar and public libraries, these bad conditions are notably present.

The building itself was constructed throughout in a fireproof manner, with nothing combustible except the window frames and doors. Clumsy wooden book stacks have, however, been installed, although almost everywhere these have in recent times given place to iron ones,

which are more elegant and in every respect to be preferred, as I have mentioned on previous pages and shall mention again. Wooden cases were chosen "because iron rusts in the damp climate of Chicago, because it is cold to the hand and is ugly." That iron easily rusts in Chicago is shown by the fact that in midsummer a pair of steel scissors, if not cleaned daily, soon becomes covered with a coating of rust, exactly as in the moist heat of the Tropics, but if the iron is suitably covered with a coat of varnish it does not rust, as is clearly shown by the examples of iron work in John Crerar Library and the public library in Chicago. The other objections made to the use of iron are, if possible, still less tenable. The other furniture is also made of wood, and not of iron, as in the building of the historical society.

A very remarkable peculiarity of the installation of the Newberry Library, is that each principal science is assigned a room by itself, with facilities for reading, so that any one who wishes to read on a subject can go at once to the division relating to it, get his book very quickly and proceed to work. This is certainly, in many cases, a great advan-

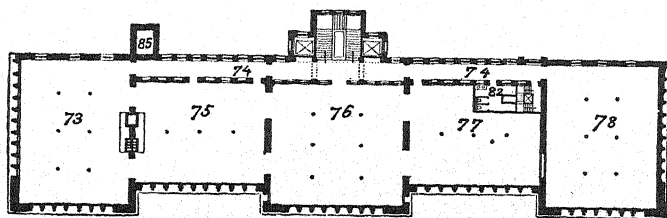


FIG. 52.—Newberry Library. Plan of fourth floor.

73, duplicates of the general library (56 by 72 feet); 74, corridor; 75, empty (50 by 62 feet); 76, empty (59 by 68 feet); 77, empty (72 by 62 feet); 78, bindery (56 by 72 feet); 82, women's closet; 85, shaft.

tage, but often the division in which the book is to be sought is not known, and related subjects may sometimes be so distributed in various divisions that complications can not be avoided. For earnest students, well acquainted with the library, the arrangement is certainly of the very greatest use. Under this arrangement, besides the principal reading room with 100 places, in the second story, there are two reading rooms (medicine), with 32 places, each in the first story, 3 in second story (philosophy, history, art, and literature), with a total of 104 places, and two in the third story (genealogy and music, natural sciences), each with 40 places, making a grand total of 316 places.

As already briefly mentioned, under the John Crerar Library, the Newberry Library principally confines itself to certain classes of subjects, and therefore sold to the former institution, in 1896, a part of its scientific stock, namely, 6,331 volumes and 1,483 pamphlets, for \$16,000. The Newberry Library has the following 6 divisions: Medicine, bibliography, history, philosophy, art and literature, science, and it is strongest on the subjects of medicine, bibliography, American local history, genealogy, music, and in periodicals and papers of societies.

On the first floor is the division of medicine (20, 21), with a special room named after Dr. N. Senn, professor of surgery in Rush Medical College in Chicago, who, three days after the library moved into its new building, promised a great part of his medical books, on the ground that it was a fireproof structure, and who also did much afterwards for the Newberry Library. He has also bought and presented the library of E. du Bois-Reymond, comprising 10,200 volumes and pamphlets,^a and that of Surg. W. B. Baum, of Göttingen. The Senn collection by itself embraces 23,400 numbers. The division of medicine comprised in May, 1901, 33,972 books and 27,583 pamphlets, among which were 459 periodicals. It will therefore compare with the largest medical libraries in New York and Philadelphia. The medical library of the United States Army Medical Museum in Washington has 352,000 books and pamphlets and contains 1,500 medical journals. The nucleus of the medical portion of the Newberry Library was formed by a stock of 17,000 volumes and pamphlets, which had been deposited by 4 medical societies of Chicago in the public library, and were transferred from thence in 1890. There is besides this, in the first story, bibliography (39), which is represented best; office rooms (31, 34, 38), and a museum (24). This museum held in May, 1901, 153 manuscripts,^b 315 incunabula, 212 volumes, specimens of artistic book bindings, 53 various other book bindings, 96 illustrated manuscripts from the twelfth to the sixteenth centuries, 113 Aldines, 97 Elzevirs, 27 Estiennes, Giuntas, etc., 150 Americana in first and rare editions, autograph copies and éditions de luxe,^c and 213 various volumes for showing methods of illustration and of modern typography—all provided with descriptive labels. The collection of fine bindings extends from Maioli (1549) and the Groliers (1550-1565) to the Frenchmen Bouzonnet-Trautz and the Englishman Bedford, and others (nineteenth century). From the sixteenth century there are 25 examples, from the

^a I found in this, papers from my own pen, which I had sent to him, my former teacher, out of respect.

^b The oldest is a Greek manuscript of the evangelists, from the twelfth century, that E. J. Goodspeed has described in the *American Journal of Theology*, 1899.

^c American history has been especially kept in view in the Newberry Library from the beginning, and in 1895 it came into the possession of a collection of 5,000 volumes relating to the earliest times, which had been collected by one of the trustees, E. E. Ayer. At present a thorough descriptive catalogue is being prepared of the entire 7,000 works of rare Americana, which contain a great deal on the North American Indians, and also rare, early maps of the American Continent. On this catalogue there are working, at the expense of Mr. Ayer, about 10 specialists of rank in the United States, the library itself, however, assuming the conduct of the matter and the bibliographical arrangement of the entire material. It has also drawn up a comprehensive scheme for the coworkers, by which they proceed according to common points of view. This very comprehensive critical catalogue promises to be a work of eminent bibliographic significance. It is fortunate in obtaining the special support of the gentlemen mentioned.

seventeenth 14, from the eighteenth 22, and from the nineteenth 109 English, 187 French, and 40 various. All are chronologically arranged, so that they can be studied according to periods, countries, and individuals. The walls of the museum are, like the antehalls, decorated with pictures and busts. As early as 1888, the American painter, G. P. A. Healy, living in Paris, presented a collection of nearly 50 oil portraits, painted by himself since 1841, among which are portraits of Lincoln, Grant, Sherman, Sheridan, the founder Newberry, and the painter himself; of busts there are, in the same place, Dante, Shakespeare, Newberry, and Henry Clay. In the antehalls there are busts of Blaine, Thiers, Guizot, Lesseps, Liszt, Stanley, and others, as well as reliefs of Demosthenes, Shakespeare, Wagner, Händel, and Mendelssohn, and also three high reliefs by J. Gelert, each 13 feet long by 5 feet wide, representing La Salle's expedition through Illinois, 1680, Fort Dearborn in 1812, and a scriptorium—Benedictine monks working on manuscripts, 1456. All these constitute the beginning of an art collection whose special advancement will be deferred to a future time.

In the second story is a large reading room (48) with 100 seats, where there are immediately accessible to the public 340 volumes of general reference works, encyclopedias, dictionaries, etc.; 801 volumes of current periodicals and papers of societies, 94 Rudolph indexer books, with shelf catalogues for philosophy, sociology, and religion, which subjects are to be found in the neighboring hall, No. 44; 133 Rudolph indexer books, with author catalogues for general works, and finally, a map case, with 10 maps on rollers. Nearby (49) are periodicals. In 1900 there were 1,260 periodicals taken, among which, as already mentioned, were 459 on medical subjects, the others being distributed, by nationalities, as follows: 569 American, 246 German,^a 215 English, 126 French, 37 Italian, 12 Belgian, 11 Swedish, 8 Canadian, 7 Swiss, 6 Dutch, 5 Spanish, 3 each of Norwegian, Danish, Russian, Japanese, 2 each of Chinese and Bohemian, and 1 each of Mexican and North American Indian. Further, history (42), with subsection of history, biography and genealogy, geography and travels, antiquities, and manners and customs; also philosophy (44), with the subsections philosophy and religion, sociology,^b and instruction. I will mention a collection of 88 rare old Bibles from 1476 on, as well as an example of the 16mo. "Caxton" Bible of 1,052 pages, which on June 30, 1877, was printed within twelve hours at Oxford, in an edition of only 100 copies, as well as finely bound in London.^c There is also a large and

^a Not only is German well represented in the periodicals, it also plays a prominent part in the books, both in the Newberry and the John Crerar libraries.

^b Sociology is in fact also represented in the John Crerar Library, but in this case, as well as in some others, an exception has been made.

^c See Report of the Newberry Library, January 5, 1880, pp. 7 and 8.

rare collection of American and English hymn books. Finally, art and humanistic sciences (50, 51), with subsections of art, literature, and languages.^a I will mention 324 lexicons in "almost all languages."

In the third story is the department of science (71), with subsections of natural science, Congressional documents, bound newspaper files, and special collections. The union of such a mixture under a department of science is not exactly happy. I will mention as specialties 1,200 volumes on China, 1,882 numbers on fishes, fish culture and angling, Egyptian and sporting collections. There is also found in the third story genealogy, and the musical library (57), with scores of the great composers, works on the history and theory of music, as well as on instruments, together with critical papers, journals, biographies; also lexicons and cyclopedias in "all" languages, and finally, works on the early Greek music and the early Italian writers. The principal item of interest is the musical collection of Count Pio Resse in Florence, which was bought in 1888. Recently the well-known American musician, Theodore Thomas, gave to this institution his great musical library. Finally, there are in the third story three lecture rooms (63-65) that hold 100 persons each, and a hall (56) which is temporarily assigned to the Friday Club, the most exclusive literary and social woman's club in Chicago.

In the fourth story is the well-appointed bookbindery (78)—everything is bound in the building. The rest of the rooms, except one for duplicates (73), are vacant.

On either side of the principal stairway there is a passenger elevator from the basement to the fourth story, besides a book elevator at another place, as shown in the plans, figs. 48-52.

The installation and marking of the books is done according to Cutter's seventh system^b with some modifications. Every section has the Cutter letters and numbers and to this is added an author's number according to a special list of the Newberry Library. The books stand in the order of their numbers, as in the Dewey decimal system.

The method of cataloguing of this library is quite peculiar and extremely ingenious, and is according to the system invented by the assistant librarian, A. J. Rudolph, a Hungarian, who from 1879 to 1894 was assistant librarian in the San Francisco Free Public Library. Fig. 53 shows the Rudolph continuous indexer with its glass cover and

^a In June, 1901, the Newberry Library purchased the well-known Library of Prince Louis Lucien Bonaparte, who died in 1891. It contained 15,000 volumes on European languages. Negotiations for this lasted two years. It is a most important acquisition.

^b C. A. Cutter, *Expansive Classification*, Boston, 1890, et seq. and the *Expansive Classification*. *Transactions and Proceedings of the Second International Library Conference*, London, 1897 (1898), pp. 84-88. "Expansive Classification" signifies a scheme of seven tables of classification of progressive fullness, designed to meet the needs of a library at its successive stages of growth, therefore "expansive."

door opened. The titles of the books are placed upon strips of cardboard 4 inches long and 1 to 6 inches or more in width, as may be necessary; these are shoved into a thin tin plate or frame grooved at the sides, 15 inches long and $4\frac{1}{4}$ inches wide, so that each such plate may contain 30 to 50 titles. In order to lighten the plates they are perforated with 18 holes of one-eighth inch diameter in two rows. The plates are hung with their long edges together like an endless chain, which runs over two drums and can be turned either to the right or to the left. As the strips of cardboard are easily moved new titles may be put in as needed. A case holds 1,000 frames with 30,000 to 50,000 titles which can be passed in review, either quickly or slowly at will. A Rudolph continuous indexer, with 500 frames for 15,000 to

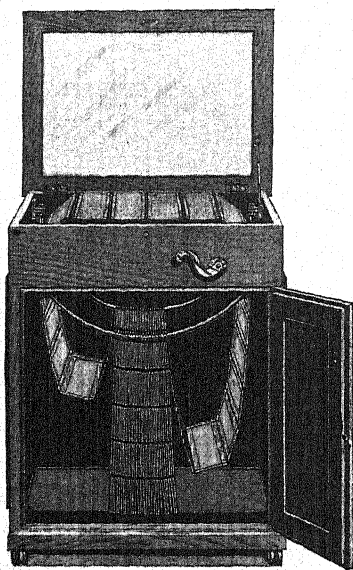


FIG. 53.—Newberry Library. Catalogue case.

25,000 titles, costs \$150 and can be furnished by Thomas Kane & Co., 137 Wabash avenue, Chicago. A quite similar arrangement is the Rudolph indexer book, fig. 54. This is $12\frac{1}{2}$ inches long and 8 inches wide and contains 10 stiff leaves for from 600 to 800 titles. It costs at the house just mentioned \$5.75, and is also prepared in other lengths and thicknesses. Leaves may be shoved in and out at will, or a volume that has become too thick may be divided into two. These two methods are extensively used in the Newberry Library—1,075 Rudolph indexer books, 463 being for the genealogical catalogue, and 612 for the shelf and principal catalogue.

A further specialty of this library is the "Rudolph pamphlet binder," bound on the same principle as the Rudolph indexer book shown in fig. 54, a practical and very tasteful although somewhat expensive way of binding a series of pamphlets together. A cheaper and good way of binding single pamphlets is afforded by the "Newberry binder," a simple cover of enameled cardboard with a linen back, rather neatly made up.

The cards for the indexer are manifolded upon the typewriter, but if many are required, they are now multiplied by means of Röntgen rays, according to a method invented by Mr. Rudolph but not yet published.^a The titles are written, one after the other, upon sheets

^a Mr. Rudolph in this way manifolded both print and illustrations by means of the Röntgen rays. He also uses a device, as simple as it is effective, for splitting apart leaves that are printed or illustrated on both sides, in case it is desired to use both

by the typewriter, pasted upon cardboard, and then cut apart to slip into the indexer.

All that can be done by the bookbinder, like the mounting of cards, the preparation of the Rudolph indexer books and the covers for the pamphlets, the pasting and cutting of strips for the indexer, repairs, etc., is done in the bindery of the library. All books are stitched with from four to seven threads which are often of silk, the backs are covered with binder's gauze and provided with linen guards stitched on. All plates are attached to muslin guards, much-used volumes have parchment corners, and all are gilded on the upper edge. All parts of yet incomplete volumes of journals, and works issued in parts, are temporarily bound in Rudolph binders. The cover of one of these binders costs the library 30 cents, and the appliances for holding each pamphlet, 10 cents, so the cost of a volume of five pamphlets would be 80 cents, certainly a relatively heavy expense, but such a volume is extremely solid and very elegant. If a pamphlet is to be bound by itself, the simple Newberry binder is used, which costs the library $4\frac{1}{2}$ cents. The production of the Rudolph indexer books costs the library, for the size $12\frac{1}{2}$ by 10 inches, with 10 stiff leaves, or 19 by 10 inches with 15 flexible leaves, \$2.20 each.

sides of the same leaf. A further very remarkable manifolding process in blueprint is used by Mr. Rudolph for the formation of catalogues. For instance, the Newberry Library in 1899 prepared 10 copies of a folio volume of 500 pages, which bears the title: "British Museum. Catalogue of Printed Books. Accessions, January, 1880, to March, 1899. Academies, with an Index." It is an alphabetically arranged register, comprising some 5,000 titles (with an index of about 3,000 entries) of accessions concerning "Academies" acquired by the British Museum from 1880 to 1899; these titles were contained in 446 single publications of the British Museum, so that it was difficult to find anything in them. They were cut apart, arranged in alphabetical order, and manifolded by blueprinting, which is very quickly done and very cheap. A page of 25 titles costs 4 cents exclusive of labor, a volume of 500 pages therefore costs \$20 a copy. It was contemplated to combine in 40 such volumes, alphabetically arranged, the 900,000 titles of new accessions to the British Museum from 1880 to 1899, but this was stopped after the first volume, because the British Museum had, in the meantime, the prospect of a more speedy publication of its supplementary catalogue of printed books. The method employed by the Newberry Library is, however, so remarkable and promising that I did not wish to leave it unmentioned. Mr. Rudolph had the great kindness to present me with a copy of the 10 that had been produced, as well as to provide me with examples of the various stages of the work, which I will be glad to show to any who are interested. On the method itself he has published an article in the *Library Journal*, XXIV, 1899, pp. 102-105, "The Blueprint Process for Printing Catalogues." I will further say that the leaves of the catalogue I have mentioned have blueprinting on both sides, but which is only apparently effected by pasting together, back to back, two very thin leaves printed only on one side. Blueprinting can only be done on one side, and the originals, too, must not bear print upon the back. Since this is the case with 200 of the first leaves of the British Museum Catalogue just referred to, which later has been published, printed on only one side, it has been necessary, before their reproduction by blueprint, to split them apart, which for this purpose has also been accomplished. Mr. Rudolph's ingenuity has been successful in overcoming all difficulties.

The following catalogues are kept:

1. Two copies of an *author's catalogue* (exclusive of medicine), one of which is upon cards for use of employees, and the other in 133 Rudolph indexer books for the public in the large reading room (48) of the second story.

2. A *general dictionary catalogue* (exclusive of medicine) in Rudolph continuous indexers and in Rudolph indexer books for the public in the large reading room. In this, therefore, are found authors, titles, subjects, and references arranged in a single alphabetical series. This catalogue contains 450,000 to 500,000 entries and when complete will fill 10 Rudolph continuous indexers and 500 Rudolph indexer books. For practical well-considered reasons, which I have no space to enter into here, all of the strips which have 10 or more typewritten lines are arranged in the books, and all shorter ones in the indexer.

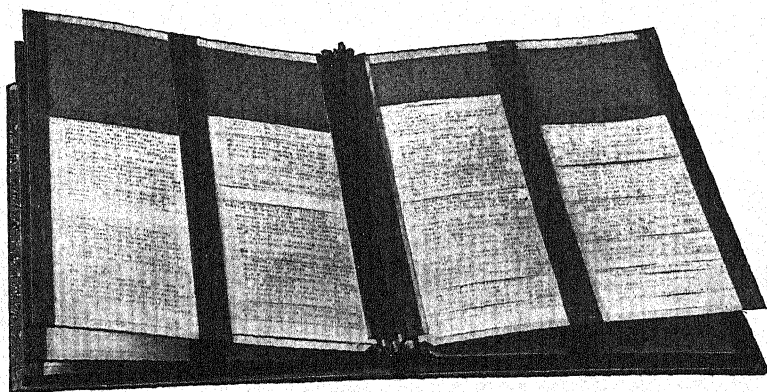


FIG. 54.—Newberry Library. Catalogue in book form (Rudolph index book).

3. Two copies of a *shelf catalogue*, according to the Cutter system—that is, a subject catalogue of all independent works, with exception of those relating to medicine, in 392 Rudolph indexer books—one copy for the employees, and one distributed through the various divisions of the library for the public.

4. *Catalogue of the division of medicine.*—(a) A dictionary catalogue on 17,800 cards—authors, titles, subjects, and references in one alphabet; (b) A dictionary catalogue of the Senn Library, on 8,200 cards; (c) An author's catalogue of all pamphlets, on 13,000 cards; (d) An author's catalogue of all pamphlets of the Senn Library, on 14,000 cards; (e) A shelf catalogue of all medical books, on 7,000 cards; (f) A catalogue of periodicals, on 2,000 cards. There are therefore 62,000 cards of the division of medicine for the use of the public.

5. A *subject card-catalogue of the museum collection* with all possible details of data, made in 5 copies, each having over 3,000 cards, placed in various parts of the library where it can be of use to the public.

6. A *genealogical index* of American families, with over 500,000 entries, which contain far more than a million references, in 463 Rudolph indexer books. This very comprehensive catalogue owes its origin to the circumstance that everywhere in the United States people are very much given to genealogical researches, everyone seeming eager to show that his ancestors belong to the early colonists, whose footsteps leading from the ancestral home are traced out with the greatest zeal; therefore all sorts of family and local histories have been purchased which could be procured in America, and the index in question is almost an index for the existing American, and for many English, family records. It includes over 200,000 families with their branches from the year 1565 on to the present time. The catalogue was begun in 1897. Four persons work on it uninterruptedly, and it is to be printed. There are, to be sure, printed indices of the kind, such as those of Whitmore and Durrie (1895), but the former contains only 12 notices under Smith, the latter only 196, while the Newberry index contains 976. A more detailed description of this undertaking is found in the *Library Journal*, XXIV, 1899, pages 53 to 55.

The library is open from 9 a. m. to 10 p. m.

Number of readers and number of books and periodicals used in the Newberry Library, 1895 to 1900.

Year.	Number of readers.	Men.	Women.	Books used.	Periodicals used.
1895.....	96,932	71,759	25,173	336,676	61,810
1896.....	104,353	76,670	27,683	271,394	58,987
1897.....	105,929	93,035	12,894	201,749	71,198
1898.....	82,800	55,684	27,116	130,620	83,360
1899.....	76,368	49,651	26,717	124,131
1900.....	76,341	51,294	25,047	126,612

These show relatively large variations, together with a general decreasing number of readers and a corresponding decrease in use, but the figures are nearly constant in the last three years. Compared with the John Crerar Library the relatively large attendance of women is striking, a difference which may be owing to the departments kept up by the Newberry Library—art, literature, music—for “popular” books are hardly kept. During my visit I saw a couple of quite young girls, still children, working there, and when I asked what they were doing, was told they were probably reading up for a school task that had been set them for home work. I mention this because it is so entirely contrary to our German practice, for if such tendencies should occur at all we would, though mistakenly, certainly curb them.

No lunches may be eaten in the library rooms, but at a definite time a room (68) is open for this purpose.

In the three lecture halls of the third story lectures are given by professors of the University of Chicago (see also, p. 460).

The number of employees is 53, as follows: 1 librarian, 1 assistant librarian, 21 assistants and cataloguers, 7 pages, 3 clerks, 9 bookbinders, 6 attendants, 1 engineer, 2 checkers, 2 watchmen. As far as one can judge from the annual reports, which are brief and indefinite, the library had spent up to the close of 1899, \$391,843 for books, periodicals, and fittings; about \$340,000 for purposes of administration—that is, for fourteen years about an annual average of \$28,000 for books, etc., and \$24,000 for administration, there being an annual average increase of about 17,000 numbers, about one-third of which, however, were gifts; these in 1900 were 3,675 numbers. In 1900 the income from the Newberry bequest—and no other income is available—amounted approximately to \$108,000, of which about \$31,000 was used for salaries, about \$10,000 for books, about \$1,200 for heating and lighting, about \$4,800 for bookbinding, including that of the catalogues, about \$35,000 for repairs, etc., to the houses owned by the library, for insurance, postage, freight, printing, etc. The remainder of over \$25,000 is probably held in reserve, as there is no information concerning it.

The first librarian, Doctor Poole, died in 1894, and in his place was appointed J. V. Cheney, who since 1887 had been head librarian of the San Francisco Public Library, from which he brought to Chicago A. J. Rudolph, his right-hand man, and here introduced with him the Rudolph methods of cataloguing.^b

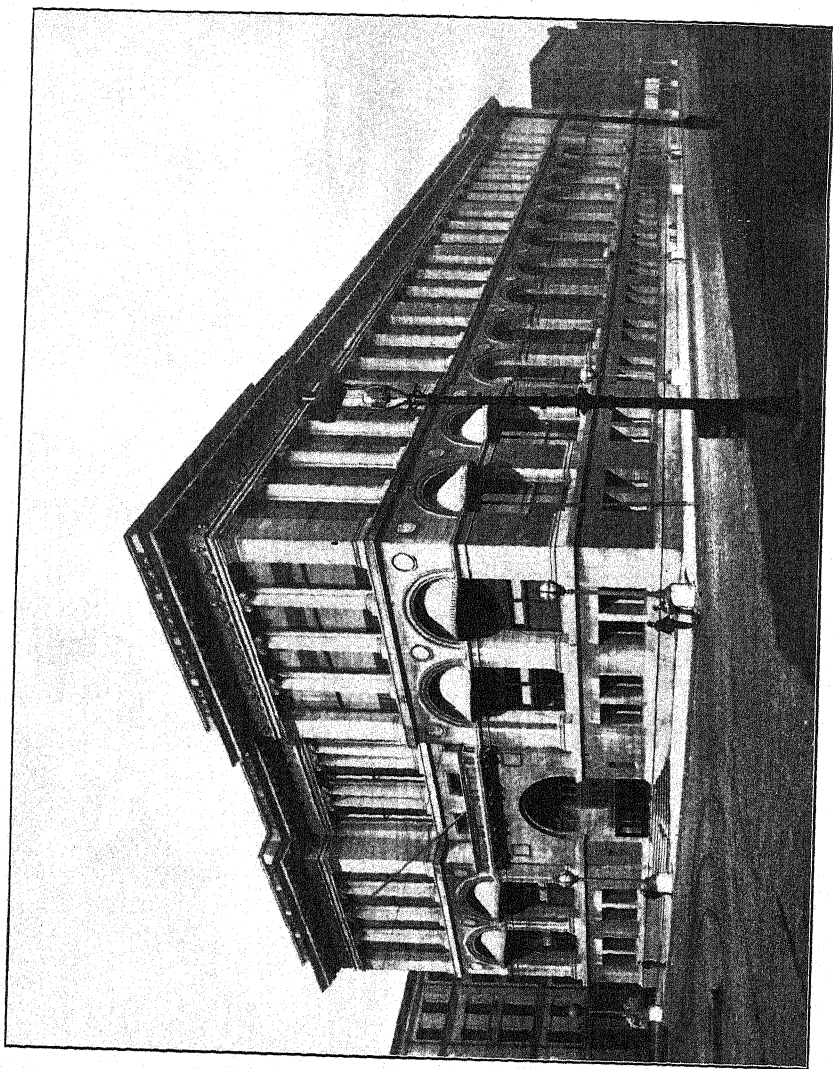
The library has thus far published nothing except short annual reports.

Only quite exceptionally are books allowed to be taken from the building. They are then sent to a library that is nearer to the scholars who may require them, such as the University of Chicago, the Field Columbian Museum, the Northwestern University at Evanston, etc. The question as to whether a reference or a circulating library is the most useful form is well worthy of investigation; there must certainly

^aThe city levies no taxes on the library itself, though it does on the buildings, from which the institution derives a great portion of its income, and this tax amounts to over \$25,000 annually. This seems astonishing when the public utility of the Newberry Library is taken into account, but, as with us, in the matter of taxes all generous feelings are abandoned. For example, the Royal Dresden museums, which are exclusively kept up by the State, must pay taxes on articles imported from foreign countries, only objects for the collections themselves being free; neither do they enjoy free postage, as is the case with all university institutes and many similar museums in other German States.

^bCheney and Rudolph published in San Francisco, among other things, a very fine and original catalogue: San Francisco Free Public Library. Classified English Prose Fiction, including Translation and Juvenile Works, with Notes and Index to Subject-references. No. 6, 1891. viii+306 pp. Lex. 8vo. Mr. Rudolph conceived in San Francisco his original indexer, and it was first put in operation there.





CHICAGO PUBLIC LIBRARY.

be many local conditions which bear upon the matter. In our small German university cities, for example, where learned men use the books for exhaustive study, and the same books are rarely wanted by different persons at the same time, and where besides there is hardly any outside public that uses the library, a reference library is certainly not to be preferred to the lending library system now in use. But in cities where a great, general public has need for books, it appears to me that the lending principle adopted by us is less called for, but certainly in this case such means ought to be adopted as obtained in the American reference libraries. The libraries must be opened to every one from morning until evening without onerous conditions, and sufficient opportunity must be afforded for undisturbed reading. The catalogue must be, as there, made practical and accessible, the books must be placed according to an easily intelligible system, access must be had to the bookshelves; above all there must be employees who are exclusively at the service of the public and make it their principal business to attend to readers—arrangements, in short, which, with some exceptions, we are not at all acquainted with in Germany and do not even anticipate.

The Newberry and the John Crerar libraries are a noble pair, twin children of civic patriotism. In spite of their being a mile and a quarter distant from each other they may be considered as a unit, since their field of work is more or less limited with regard to each other. Chicago has in them, a beautiful, excellently arranged, most freely accessible, scientific, public reference library, in two separate buildings, already comprising 325,000 numbers,^a and the total collection of the two libraries will, within twenty-five years, at the present rate of increase of 27,000 numbers a year, amount to 1,000,000. The Berlin library has a round million, the Paris library 3,000,000, and the London 4,000,000 to 5,000,000 numbers. Chicago, however, loves to make unexpected leaps in its development, and who knows how quickly fortune may confound such a calculation. The noble contest between the Newberry Library and the John Crerar Library will certainly produce the most elaborate results.

15. CHICAGO PUBLIC LIBRARY.

The idea of a public library, conceived by Benjamin Franklin in 1732, has received a most magnificent development in the United States, while in Germany the slight beginnings that have been made are hardly worth mentioning. "America has taken the lead in developing the usefulness of public libraries," said Thomas Greenwood in 1894, on page 524 of the fourth edition of his monograph entitled *Public*

^aThe Public Library of Chicago, which is quite near the John Crerar Library, has 322,000 numbers; the three libraries together, therefore, have nearly 650,000.

Libraries: A History of the Movement and a Manual for the Organization and Management of Rate-supported Libraries (598 pp., London). But since then the rise of the public libraries in the United States has been even more extraordinary, and as a crowning achievement of the entire movement the public libraries of Boston and Chicago bear witness, and this will soon be further exemplified in New York, as mentioned in Part I of this paper.

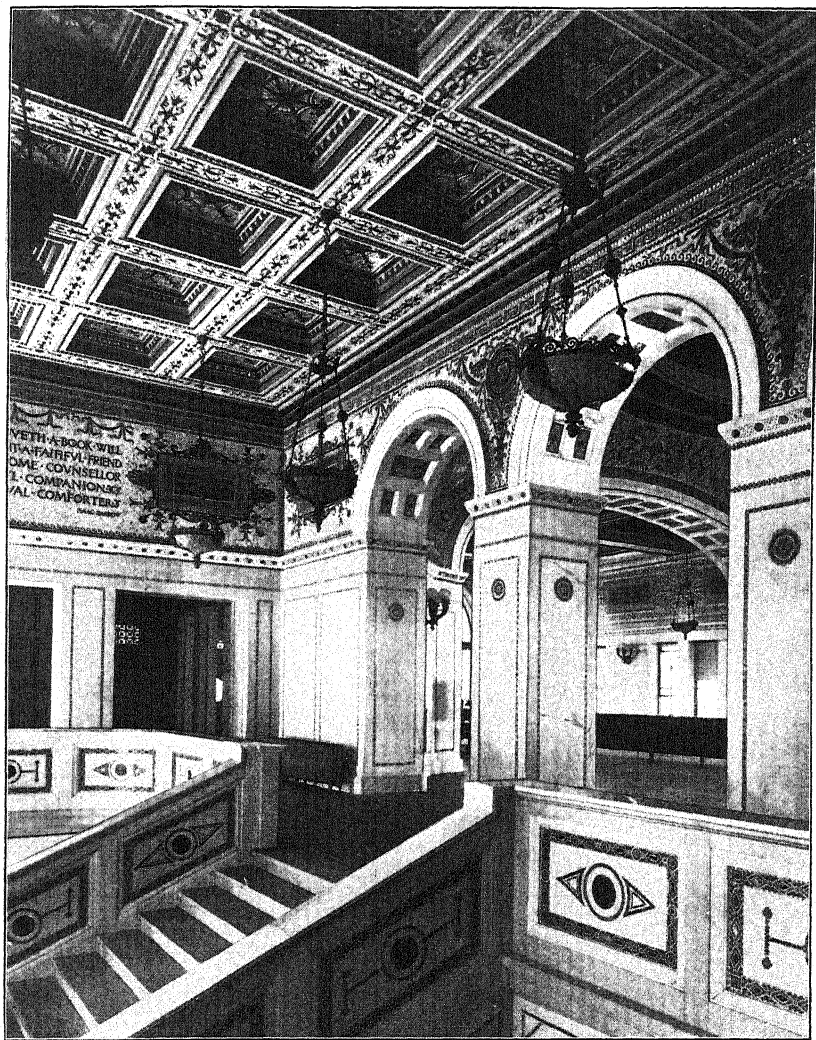
In 1899 there were in the United States 7,184 public libraries, with 35,000,000 books.^a Each village, as one may say, possesses one,^b and their influence upon general culture is perhaps as great as that of the schools. These public libraries are maintained, some of them by the community, some by private persons, and some by both. Andrew Carnegie alone has, since 1886, founded 66 libraries, costing \$8,500,000, and quite recently he has founded 65 more in New York City, at a cost of \$5,200,000.^c The Boston Public Library, with 15 branch reading rooms and 14 delivery stations, costs the city yearly \$288,641, or over 50 cents each for a population of 561,000. The Chicago Public Library, with 6 branch reading rooms and 65 delivery stations, besides stations in the public schools,^d costs the city \$263,397—that is 15½ cents annually each for a population of 1,700,000. Massachusetts has most completely developed the public-library system, and it is a mark of honor on the escutcheon of the State. However, the Chicago Public Library stands foremost in the world in lending each year, without charge,

^a N. M. Butler, *Education in the United States*, 1900, p. 30. According to E. I. Antrim, *The latest Stage of Library Development*, in the *Forum*, XXXI, p. 337, 1901, there are now 8,000 libraries, with 50,000,000 books; according to the United States Bureau of Education, No. 232 (*Public, Society, and School Libraries*), 1897, pp. 340 and 367, there were, in 1896, 4,026 public, society, and school libraries of 1,000 volumes and over, with 33,000,000 books and 5,500,000 pamphlets, of which there were 2 having over 500,000, 4 having over 300,000, 28 having over 100,000, 69 having over 50,000, 155 having over 25,000, 411 with over 10,000, 630 with over 5,000, 2,727 with over 1,000, and 3,167 with over 300. The number of German books in American libraries has been discussed recently by L. Triang in an interesting article in the *Berliner Tageblatt* of May 7, 1901 (Parlament's edition).

^b Recently traveling libraries have been established for farmers living in isolated situations (see p. 400 of this paper). These go from village to village (see Antrim, *Forum*, XXXI, p. 338). In the New York parks books are lent free.

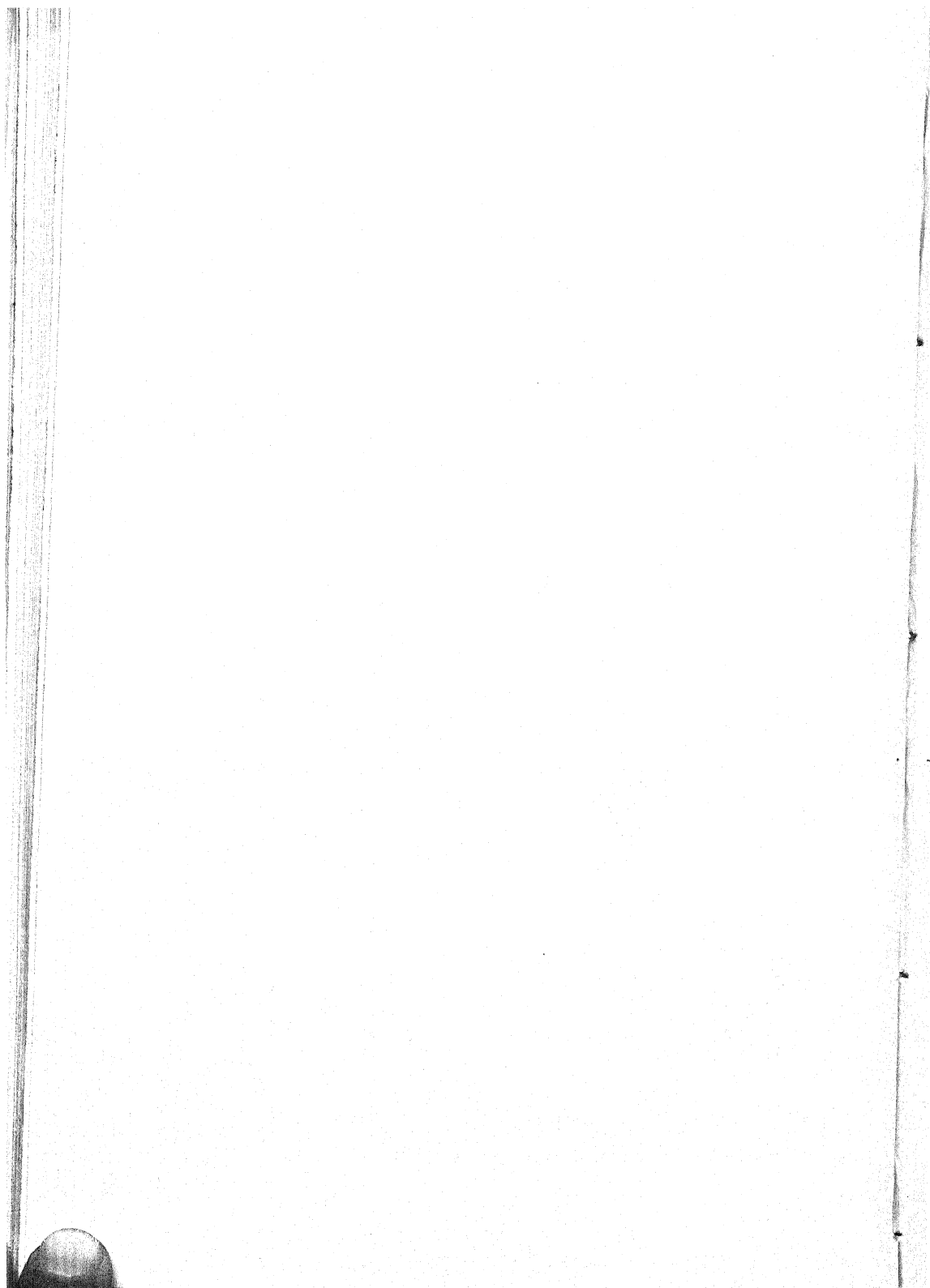
^c Besides this he has founded 18 in Great Britain, at a cost of \$720,000 (*University of the State of New York, Home Education Bulletin*, No. 31, May, 1900, p. 69). Further, he gave \$1,660,000 for other scientific endowments (*Report Commissioner of Education*, 1898-99, 1900, Pt. 1, p. 1054, and *Science*, November 23, 1900, p. 816). He writes, incidentally, concerning his gift—one can not call it a princely gift, for princes have not sufficient money to do it—to the director of the Public Library in New York, Dr. J. S. Billings: "I should esteem it a rare privilege to be permitted to furnish the money as needed for the buildings, say, \$5,200,000" (*Bulletin, New York Public Library*, V, 1901, p. 85). (Up to 1903 Mr. Carnegie had founded over 1,000 libraries and given away nearly \$100,000,000. See the *Chicago Sunday Tribune*, May 17, 1903, p. 37.

^d Compare the account of the Buffalo Public Library, p. 408.



CHICAGO PUBLIC LIBRARY.

A portion of the stairway.



1,800,000 books, and at the same time allowing to be used in the building itself more than 2,000,000 books, newspapers, and journals.

As the great fire in October, 1871, practically destroyed all libraries, both public and private, Chicago suffered from a real book famine, and the English writer, Thomas Hughes, addressed an appeal to the writers and publishers among his countrymen to provide the city

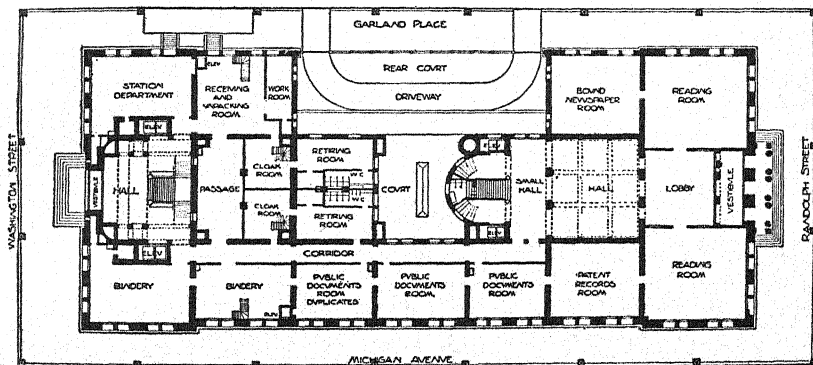


FIG. 55.—Chicago Public Library. Plan of first floor.

with books, and there quickly came in this way, from Great Britain and the rest of Europe, and from America, a total of 7,000 volumes, the nucleus of the public library which was founded in January, 1872. In January, 1873, a reading room was opened temporarily in the city hall, and in March, 1874, the library, with over 17,000 volumes, was established not far from its present location. From 1875 on it was again

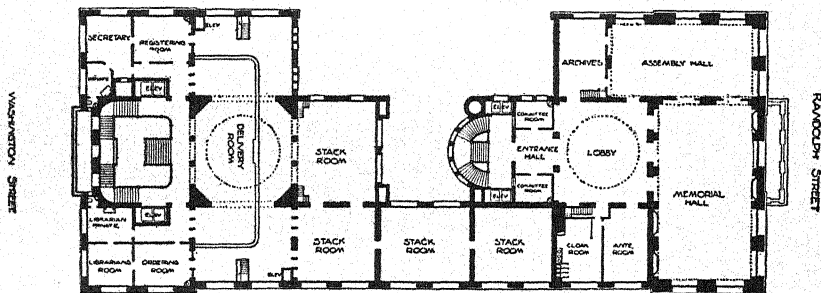


FIG. 56.—Chicago Public Library. Plan of second floor.

located in another neighboring building, until in 1886, with 120,000 volumes, it moved into the fourth story of the new City Hall, whence, in 1897, with about 230,000 books, it was transferred in six and one-half days to its present palace,^a and fourteen days thereafter, on October 11, the anniversary of the great fire, it was opened for the use of the

^a The moving itself cost only \$657 outside of the help of the employees of the library.

public. In 1893 the corner stone of the edifice was laid, not far from the former Fort Dearborn, whose garrison was butchered by the Indians in 1812, and which was the first permanent settlement in the swamp upon which Chicago later arose. The building comprises a quadrangle between Washington and Randolph streets and Michigan avenue, its long east front facing a park along the lake. The site is immediately adjacent to the principal business center of the city, and occupies about $1\frac{1}{4}$ acres of ground, the building itself being 330 feet long, 146 feet wide, and 100 feet high above the pavement (exclusive of the balustrade). It is well orientated as to the sun, in that the free, long side faces toward the east; but opposite the remaining sides are high houses. The funds for the building were raised from 1891 to 1896 by six annual tax levies, amounting to \$2,000,000, which was borne most willingly by the people of Chicago, an example of the public spirit of that city often unjustly charged with worldliness.^a

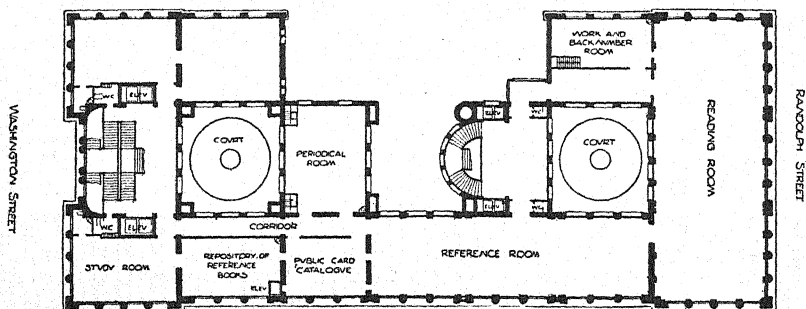


FIG. 57.—Chicago Public Library. Plan of third floor.

The disposition of the interior was more or less determined by the rights of the adjoining property holders, who stipulated that the entrance should be on the narrow side, but especially by the fact that the building must include a large memorial hall with many accessory rooms for the Grand Army of the Republic, the memorial hall in perpetuity, the accessory rooms to be devoted to this use for some 50 years.

The hands of the architects were somewhat tied by these and several other restrictions. The location within the city, where sulphurous gases arise from soft coal used, forbade frescoes and other usual kinds of decoration. As it was not wished to renounce rich external orna-

^aFrederick Harrison, one of the most eminent English historians and writers, says, in the report of his recent visit to the United States (*Nineteenth Century*, June, 1901): "Chicago struck me as being somewhat unfairly condemned as devoted to nothing but Mammon and pork. Certainly during my visit I heard of nothing but the progress of education, university endowments, people's institutes, libraries, museums, art schools, workmen's model dwellings and farms, literary culture, and scientific foundations."

ment, but on the contrary to use this for the pleasure and refinement of the people, therefore marble and mosaic work were chosen, in the hope that it might wear as well as that which Justinian in the fifth century employed in the church of St. Sophia at Constantinople. As prime necessities it was stipulated that there must be security from fire and plenty of light. The books must also be placed centrally in order to be easily accessible, and it was further prescribed, among other things, that there should be convenient public access to the rooms, spacious book delivery and reading rooms, and such furnishing and arrangement of all the rooms that they could easily be kept clean.

C. A. Coolidge, of the firm of architects Shepley, Rutan & Coolidge, of Boston and Chicago, who also built the Art Institute, solved this great problem in a most satisfactory manner. In modern Europe I would not know where to find anything similar in this line; the new German library buildings certainly can not compare with it. The original estimates were not exceeded, the total cost of the building being, in round numbers, \$2,125,000, including architects and builders' fees of about \$112,000. It is a Renaissance structure, with Greek and Roman motives, the exterior of limestone with a base of granite, the stairway, on the southern side, like the entrance to an imperial Roman palace, or, by electric light, it appears as a fairy castle of the Arabian nights, built of white Carrara marble with mosaics of colored glass, mother-of-pearl, and shell. The halls, saloons, and rooms are lined with marble. Ten different kinds of American and European marble were used. The walls and ceilings in some cases are overdecorated and florid; simplicity would here have been preferable in my opinion. The plain structure cost about \$600,000, the interior decoration about \$500,000, independently of the decoration of the memorial Grand Army hall, which cost \$75,000. I am quite unable, within the limits of this report, to give a description of the lavish magnificence here displayed, and must also restrict myself as to my illustrations, which would otherwise give the reader a better idea of it. I must content myself with saying that as a whole, whatever might be said of single portions, the structure is an imposing artistic creation, to which justice can not be done in a few words.^a

The floor plans, figs. 55 to 57, show the arrangement of the rooms. The principal entrance, from Washington street, lies toward the south; the principal front, Michigan avenue, toward the east. The book stacks extend partly through three stories, there being six

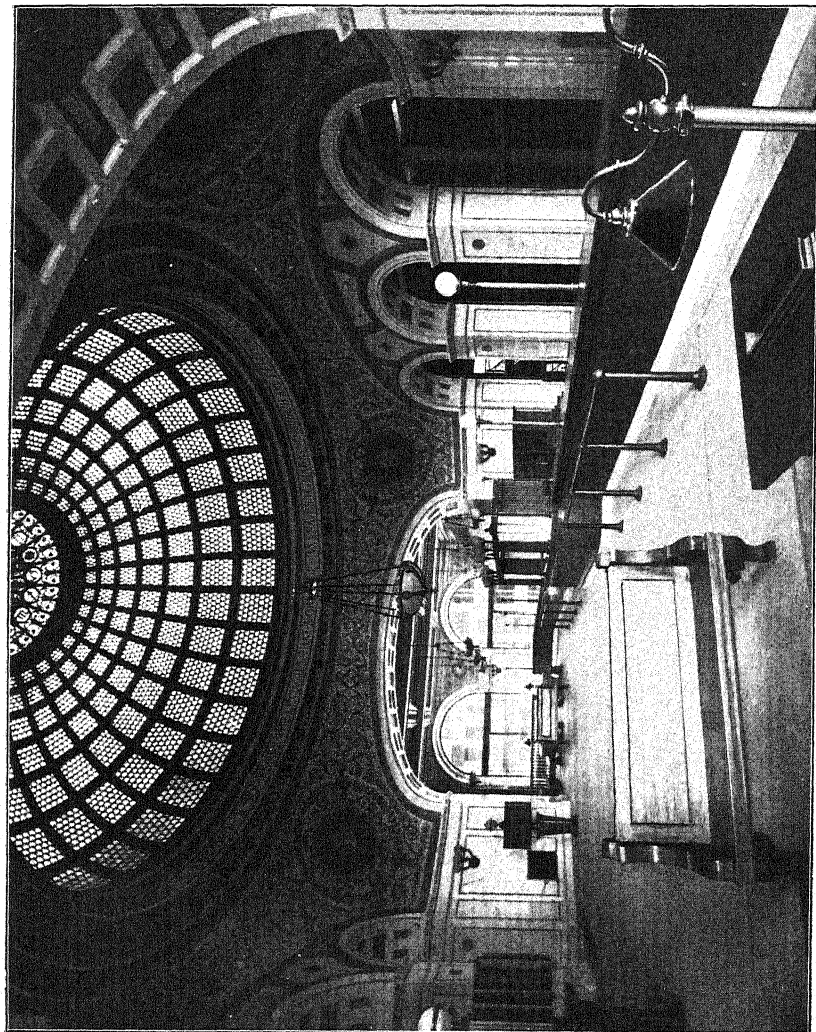
^aDescriptions of it are found, among other places, in *The Inland Architect*, supplement, January, 1898; the *Quarterly Book Review*, December, 1897; *Public Libraries*, November, 1897; *The Outlook*, October 2, 1897. It should be mentioned that nine-tenths of all the work was done in Chicago itself, certainly a testimony to the splendid ability of the industrial arts there. I have used especially the publication first cited, which is richly illustrated.

decks, one above the other. They are immediately back of the delivery room on the second story (Plate 30).

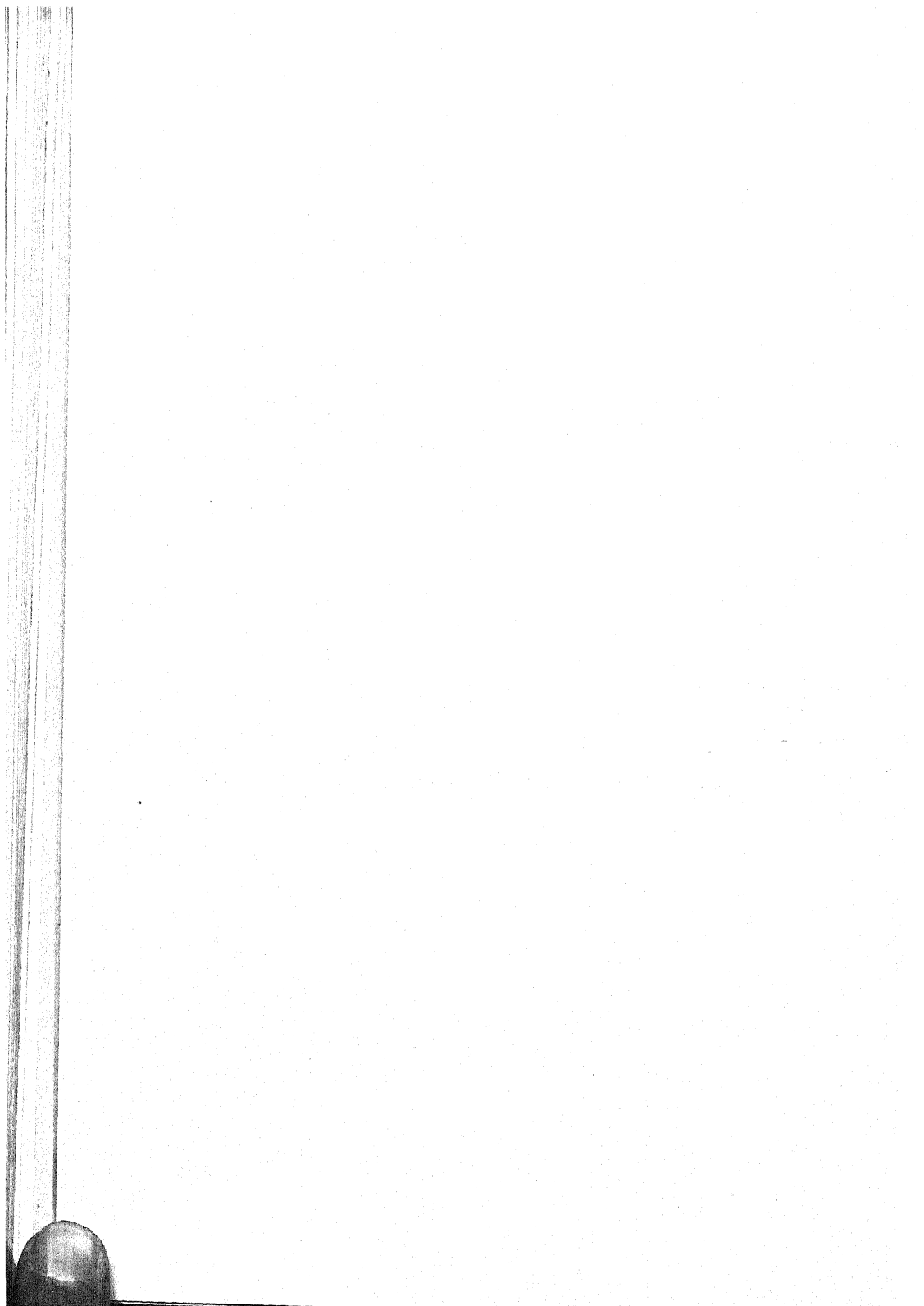
This room, 144 feet long and 53 feet wide, runs across the entire building and opens immediately upon the principal stairway, constituting with that stairway the most splendid feature of the building. It is decorated in the richest manner with marble and glass mosaics, especially in the high central cupola, which is 38 feet in diameter at its base and 11 feet high (36 feet above the floor). Perhaps nothing similar to it has been produced since the fourteenth century. At the northern end of the second story are the rooms for the veterans (memorial hall, assembly hall, etc.). There is here inserted a mezzanine story. Over this, in the third story, is the great reading room for current periodicals and newspapers (Plate 31), which, like the delivery room, runs across the entire building, together with the reference room. The reading room has 415 seats and about 100 standing places at the newspaper racks, and the reference room, including the adjoining rooms, has 225 seats;^a the former is 36 feet high, 144 feet long, and 60 feet wide; the latter is 33 feet high, 144 feet long, and 42 feet wide. The collective area covered by all the rooms of the library, throughout all the stories, amounts to two and a half acres. At various places, as has been already mentioned for the north end of the second story, mezzanine stories are inserted, which has been ingeniously done without injury to the façade (Plate 28) by placing the floor of the mezzanine behind the crossbar of a window and covering it, at the same time painting it dark below, so that from without it is almost invisible. The arrangement and designation of the remaining rooms are shown on the ground plans. The rear court, on the western side, which is open as an entrance for carriages to Garland place, is later to be built over, so that in the place of the now open right angle which appears in the plans of the second and third stories, there will be built three stack rooms which will directly adjoin similar rooms in the first story behind the delivery room.

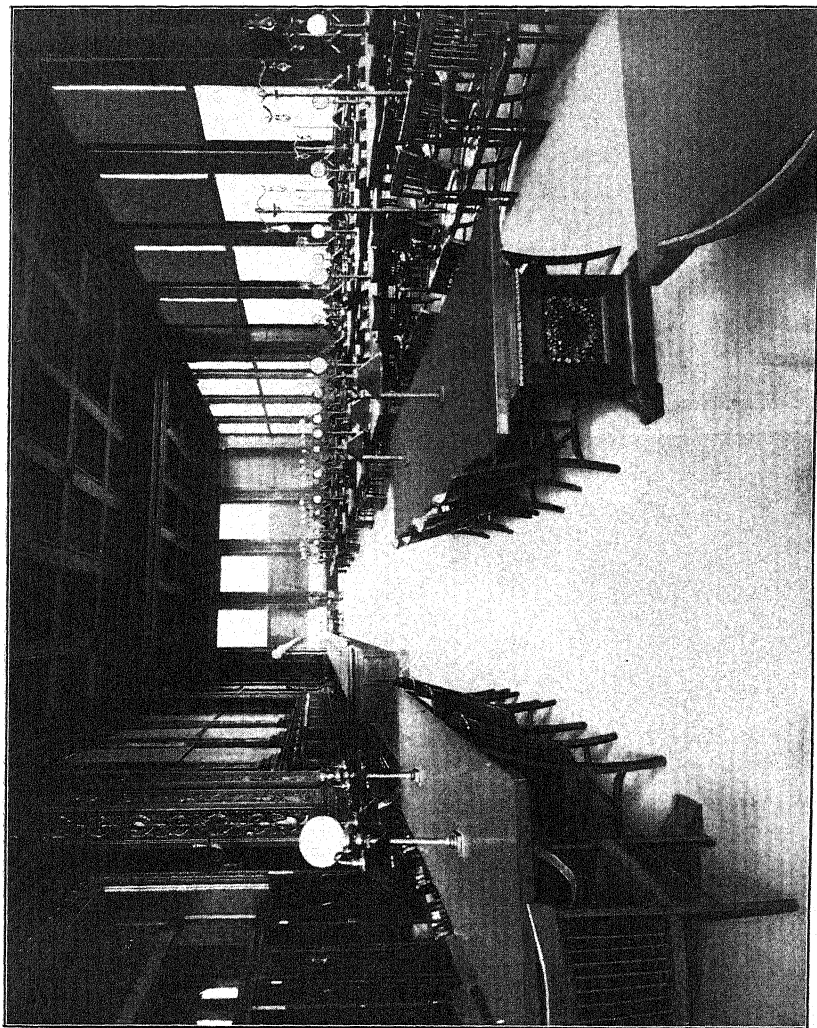
The vast machinery plant is placed in the basement. The public library is entirely independent, in that it supplies its own electric power, heat, and light (26 arc and over 7,000 incandescent lamps), and it also has its own water reservoir, rendering it independent of the city supply, if necessary, and sufficing for its normal wants for thirty hours. The arrangements of this underground world of machinery are admirable. Even in these regions there rules a high degree of elegance and magnificence. It is a fault, however, that the powerful engines stand in the building itself, and therefore shake it. In the evening, when they are working with their full power, there is at certain places a strong tremor not only disagreeable to feel, but very

^a A total of a thousand persons can work at the same time in the public library.



CHICAGO PUBLIC LIBRARY.
Delivery room.





CHICAGO PUBLIC LIBRARY.
Large reading room.

injurious to the building itself, as, for example, to the mosaic floors, which already have suffered at various places.^a If the engines must stand in the house itself, they should be isolated, as in Columbia University, already mentioned, although this would be more difficult in the swampy ground of Chicago than in the rocky region of Columbia University. Eight electric elevators serve for the incessant demands of visitors. The stairs are but little used.

The problem of a fireproof building has here been perfectly solved. In Chicago, as well as elsewhere in America, it is customary, when constructing large buildings, to first of all erect a steel framework or skeleton, which runs from top to bottom and across the building (see fig. 58), and into this frame are set the walls of brick or stone (as with us a framework of wood is filled out with stones and clay) and the building can then be carried on from above downward, instead of the opposite, since each story is independent from the others and rests on its own foundation. In the public library this has been avoided, for if in such buildings stores of combustible goods begin to burn, the steel beams bend and the whole structure falls together like a house of cards. In the public library the steel construction rests upon the walls of the building, not the reverse, and steel supporting columns are entirely avoided. The great spans between the walls are mostly bridged over with box girders, but also with plate and lattice girders between which are iron beams. The span of the box girders is 66 feet. Fig. 59 gives a representation of the steel construction of the floor. The spaces between the floor beams are filled in with large porous terra-cotta blocks. The steel beams and supporting columns are also encased with terra cotta, which makes them absolutely fireproof. The floors are laid in cement, upon which are set marble mosaics, glazed tile, or parquetry, the last, however, only in offices and workrooms, where it is covered with corcacin, to the value of about \$3,500. The gang plates at the book stacks are made of hard glass or tile. The walls are wainscoted or lined with marble. Window casings and sashes, as well as book stacks, are of iron (costing about \$30,000), the other furniture (costing about \$66,000) and the doors are of wood. On the latticework, doors, and elsewhere much rich bronze work is used. For important documents and rarities special fireproof vaults with iron cases are provided, as shown in fig. 60.

On account of the swampy foundation of Chicago the library rests upon 2,400 piles, each 55 feet long and of 12 inches diameter, that are driven to an average depth of 75 feet below the level of the street

^a Whether or not this is to be ascribed to the strong shaking alone I will not state positively. It is also possible there is some fault with the cement base. In any event, however, these tremors can do no good to the building. I even see that they endanger its permanence, and that ultimately an engine room will have to be built outside.

pavement, and upon them rests a double layer of beams, crossing each other at right angles, and then 23 feet of masonry, upon which the

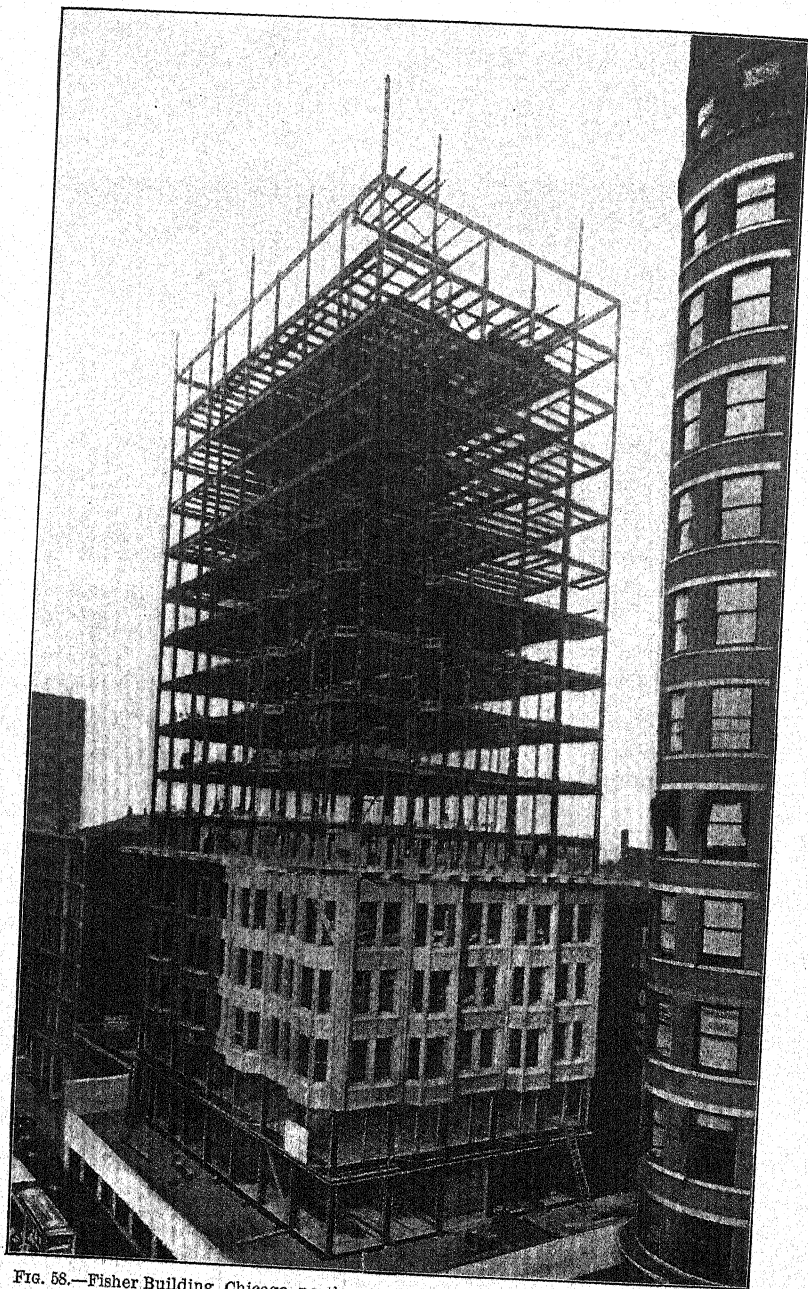


FIG. 58.—Fisher Building, Chicago, northeast corner of Van Buren and Dearborn streets.

building stands. The portion of the basement that contains the boiler and engine room does not rest on the walls, but upon a steel foundation

supported by steel pillars and beams. The foundation cost about \$164,000 and the machinery plant about \$191,000. There are, among

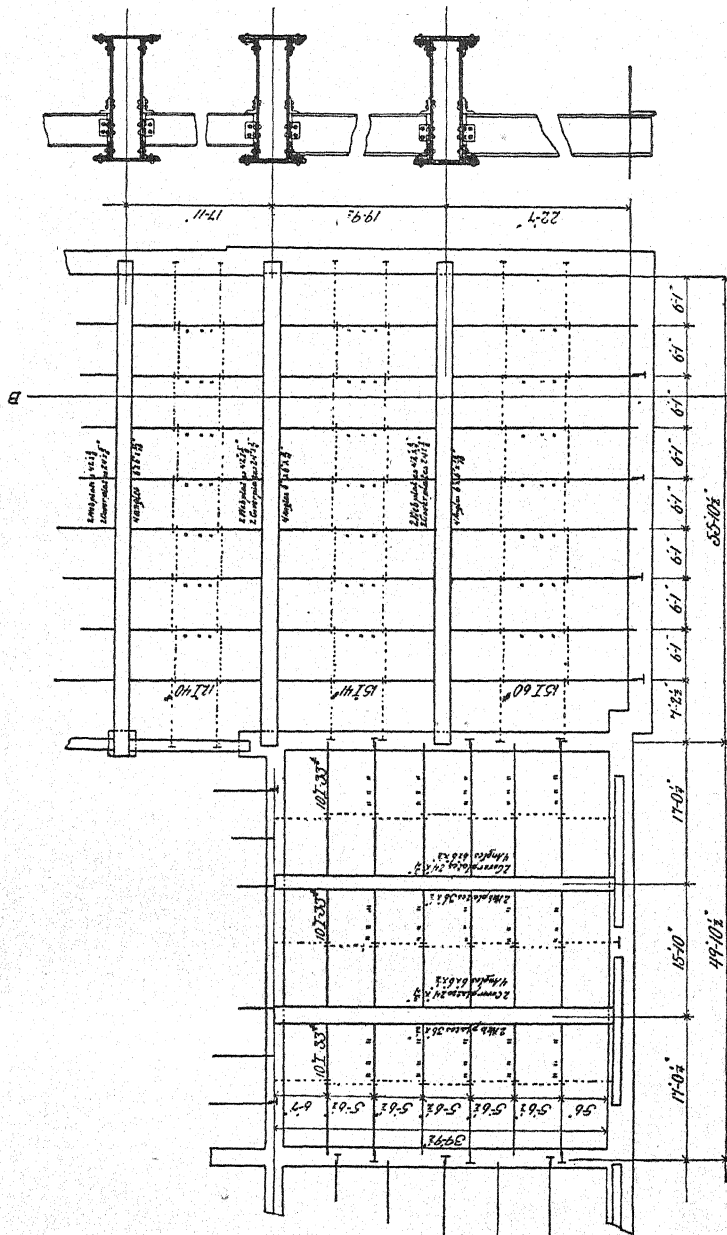


FIG. 59.—Chicago Public Library. Steel construction between the floors.

other appliances, two fire engines always ready for use, which can each throw about 700 gallons of water a minute, should necessity arise.

Long lengths of fire hose are distributed everywhere. Very ingenious and important also is the installation of the water system on the three sides of the building with houses opposite, by which, from the roof downward, a screen or veil of flowing water can be set in motion in case of fire, an arrangement that has already on one occasion practically proved its usefulness, and which is certainly worthy of imitation. The accessory stairways are of iron. The delivery room can be shut off from the adjoining book stacks by steel roller shutters. No fire is allowed except that for heating in the basement. In the book bindery and in the rooms reserved for employees at the noon hour, etc., electric heating apparatus is used. Everything, in fact, is done to reduce the danger from fire to a minimum. If one wished to be rigorously critical, it might be adversely mentioned that the furniture, such as tables,^a

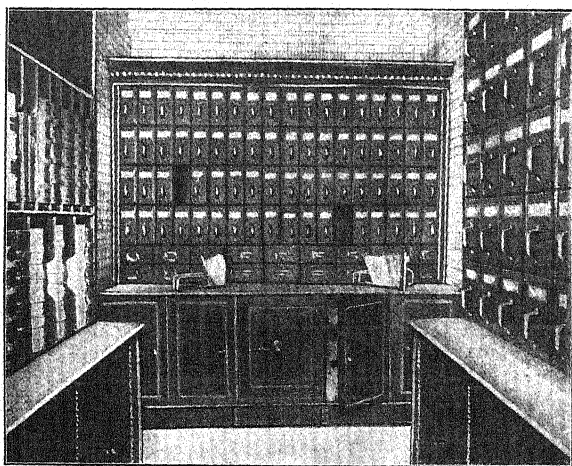


FIG. 60.—Chicago Public Library. A fireproof vault. (See p. 479.)

stools, etc., as well as doors and elevators, are of wood, although there is no real danger, as the woodwork is very massive. Notwithstanding this, the building has recently been insured for \$500,000, at an annual premium of \$1,000, for the special reason that the adjacent buildings to the westward are quite near. The night service consists of a watchman and engineers, the latter working in shifts of eight hours. The cleaning is for the most part done during the night, using the electric light (there is no other) as is needed.

In an equally successful manner the architects have solved the prob-

^a The table tops are unusually massive, but have the disadvantage of warping, so I found a great number of them, on this account, put aside for repairs. In the working and office rooms some of them are, as an experiment, covered with linoleum. Iron tables with linoleum cover would certainly be preferable. There is, too, excellent iron furniture for rooms, made in America (see remarks on this subject, p. 380 et seq.).

lem of everywhere providing abundance of light. The high, broad, closely spaced windows and the court (see plans) everywhere admit so much daylight that nothing better could have been devised. This is especially the case on the eastern and northern sides; also in the delivery room with its large windows at both ends and the glass cupola, as well as in the reading rooms frequented by the public and at the book stacks. Only a few inner rooms of the ground floor are so dark that artificial light is necessary in the daytime.

The demand for convenient access to the public rooms has also been successfully met. The delivery room of the second story, frequented daily by thousands, is conveniently reached by the magnificent stairway of the south entrance unless it is preferred to use one of the four elevators near by, while the reading rooms of the north and east sides, which likewise are daily visited by thousands, can be directly reached by four elevators, by the south stairway, or by the central stairway. It is a special and novel architectural characteristic of this library that the reading rooms are situated at the top, while elsewhere they are ordinarily placed in a central hall, at ground level, and lighted from above, an arrangement that occupies a large ground area and has, besides, many other disadvantages, as is well known to everyone from experience. For this reason the new public library in New York, as already mentioned, adopted the plan of putting the reading rooms in the third story. Besides, the rooms can be much more quickly reached by elevators than by stairways, only as in the Chicago Public Library, there must be a sufficient number at the disposal of the public. The greatest care has been given to these elevators. They are operated by electric power, therefore run quickly and noiselessly, can be easily stopped or started, and their doors open and close automatically by atmospheric pressure. They are perfect. The grill work of the elevator openings at each story is of bronze, and the elevators themselves are ornamented with much beautiful bronze work. Besides the eight elevators for the public, there are two for the internal administration and six smaller ones for transporting books to and from the stacks. The elevators cost about \$21,000.

The heating is effected by a direct-indirect system with steam-heating coils for use in cold weather and hot-air blast for milder weather. It is kept up entirely by the exhaust from the engines, and its cost is therefore relatively slight. Recently the so-called smokeless coal has been used, whereby about \$6,500 a year have been saved. The temperature is in some cases regulated automatically by thermostats, but usually on the spot by the opening and closing of heating flues.

Ventilation.—In the basement seven fans draw out of the building 327,000 cubic yards of air an hour through gigantic sheet-iron pipes and seven others blow in 280,000 cubic yards of fresh air. This air is warmed in cold weather, washed by passing through sprays of water,

again warmed, if necessary, by passing over hot pipes, and is forced

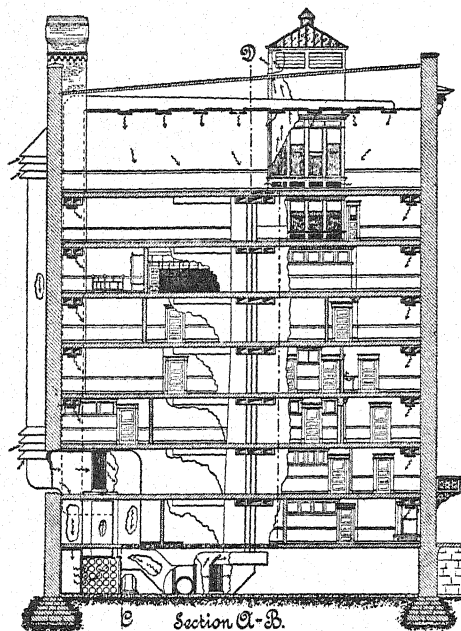


FIG. 61.—Chicago Telephone Company. Plan of ventilating plant.

into each room near the ceiling and drawn off near the floor. It can be independently shut off or turned on for any of the rooms. At first none of the windows were arranged for opening, the plate glass being set in solid iron frames with cross-bars. By this arrangement only purified air could enter, except such as streamed in through the doors which open onto the street. This was very essential for keeping the interior of the building and the books clean; but the apparatus did not work satisfactorily. The rooms were often too hot, and consequently, in 1899, at a considerable cost, a row of windows was changed so as to be opened, and thus the entire excellently devised system was rendered useless. At the time of the very high temperature that prevailed in Chicago at the beginning of September, 1899, I found the rooms intolerably warm, especially those with an east and southeast exposure, in spite of the open windows and many electric fans placed everywhere. It could not have been warmer with the defective ventilating apparatus, some corridors and rooms being like a bake oven. Much dust came through the open windows into the beautiful building, and the noise of the street was distracting.

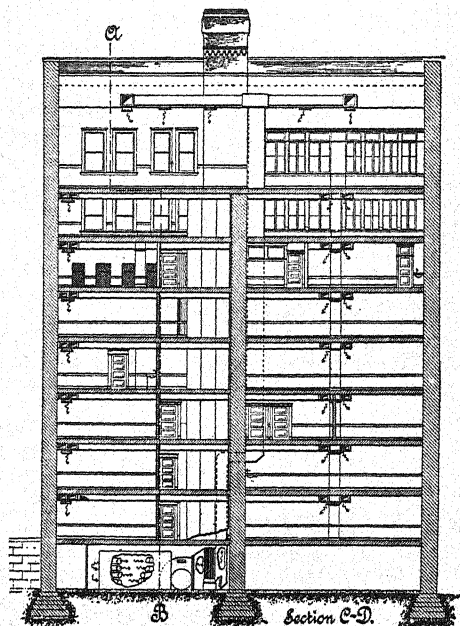


FIG. 62.—Chicago Telephone Company. Plan of ventilating plant.

As it was important for me to ascertain clearly the value of the

ventilating system, I visited the operating room of the Chicago Telephone Company in the seventh story of a building on Washington street, where a similar system has been going on for three years. It was put in because dust was injurious to the electric contact. I found there 120 women crowded closely in a relatively small room where day and night they do nothing but make and break connections, a slavery indeed.^a The ventilation, however, had not been operating for a fortnight, as a wing to the building was under construction and the windows were open, so that the noise of the street was very annoying. I learned that the women who had complained of the ventilation system since its installation three years before, had during this fortnight when it was not working, wished for its restoration. This reminded me of the experience which I had in the Dresden Museum twenty-five years

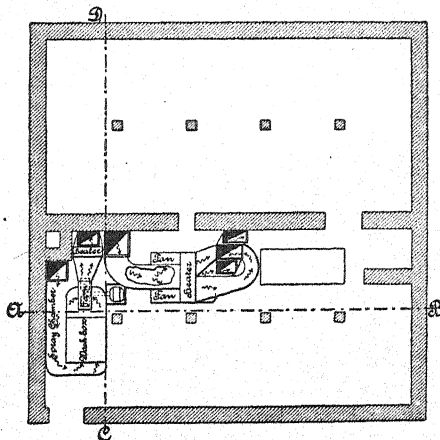


FIG. 63.—Chicago Telephone Company. Plan of ventilating plant.

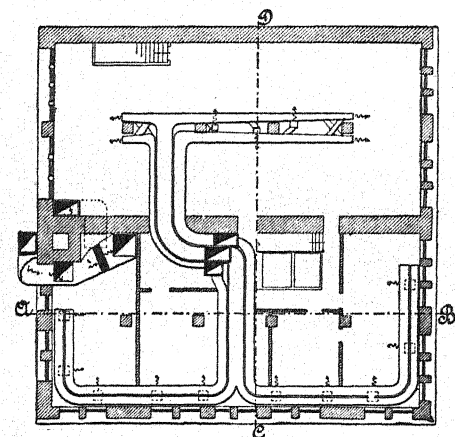


FIG. 64.—Chicago Telephone Company. Plan of ventilating plant.

ago, when the hot water heating plant was installed there. The employees complained that they were accustomed to heating by stoves and charged their indisposition and illness to the new system of heating. It was only the novelty of the method and their own prejudice that set them against it, as in Chicago, where, however, after experience it became evident that the new arrangement was the better. It will, therefore, be retained by the telephone company. In figs. 61-64 I give

the plan adopted for the installation of the apparatus, which was given me by the chief engineer of the company, who explained the matter to me with the courtesy which is everywhere shown in the United

^a They receive from \$30 to \$65 a month.

States. In the public library it has meanwhile been recognized that the reason for the ineffective working of the apparatus lay, among other things, in the insufficient speed of the fans, and it is decided to replace the motors by more powerful ones, as well as to set up two new spray chambers. Perhaps, too, the air could not be sufficiently cooled by the existing machines, since by proper apparatus for passing it over ice it may be kept at a temperature of 18° F. lower than the external air. As I have already mentioned, in speaking of the Newberry Library, the system works excellently in the Library of Congress at Washington. Further experiments in the Chicago Public Library will, however, be important, for if the system should ultimately be perfected it may be introduced into museums in smoky cities, such as Dresden, where it would bring about an extraordinary improvement, for there is now no

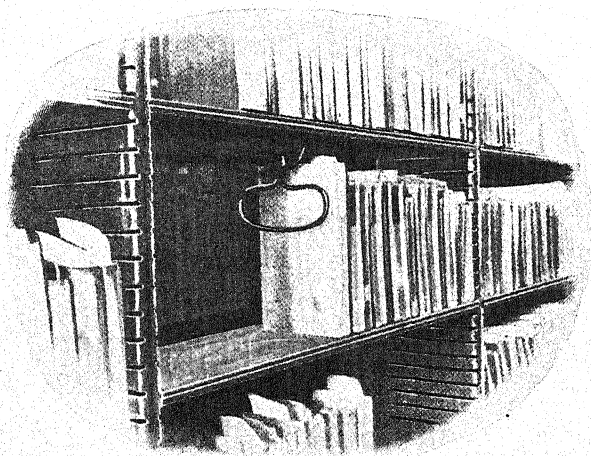


FIG. 65.—Chicago Public Library. Part of iron book stack.

end to the cleaning and renovating. Some of the collections are even closed twice a year for a fortnight for thorough cleaning.

The books themselves are installed in a most complete manner. They are placed directly behind the delivery room (see Plate 30, where behind the arches two rows of book stacks may be seen), in whose immediate neighborhood are placed 75 per cent of the books in most demand, so that mechanical devices for service at the stacks, such as I expect to describe in the Washington and Boston libraries, can be dispensed with. The stacks are of iron and are made by the Art Metal Construction Company (former Fenton Metallic Manufacturing Company) in Jamestown, New York, referred to above, which firm also made the excellent repositories for the library of Columbia University in New York (see p. 371). The stacks stand with interspaces of 40 inches, and are arranged in from 3 to 6 decks, each 7 feet to 7 feet 6 inches in height. They are 1 foot $3\frac{1}{2}$ inches wide and

double faced, so that a depth of $7\frac{1}{2}$ inches is provided for the books; eight or nine rows stand abreast in a room separated by a middle passage into two groups each 14 feet long. Each such stack, 13 feet 9 inches long, is divided for the purpose of fastening the shelf supports, into five sections, each 2 feet 9 inches long. The passageway is 4 feet 3 inches wide, and the side passages about 40 inches wide. The stacks in the public library are of a light blue color, covered with a lacquer which feels like velvet, so that the books can not be injured; all angles in addition are rounded. The shelves, of iron, are easily adjusted by means of grooves 1 inch apart; practical holders, adjusta-

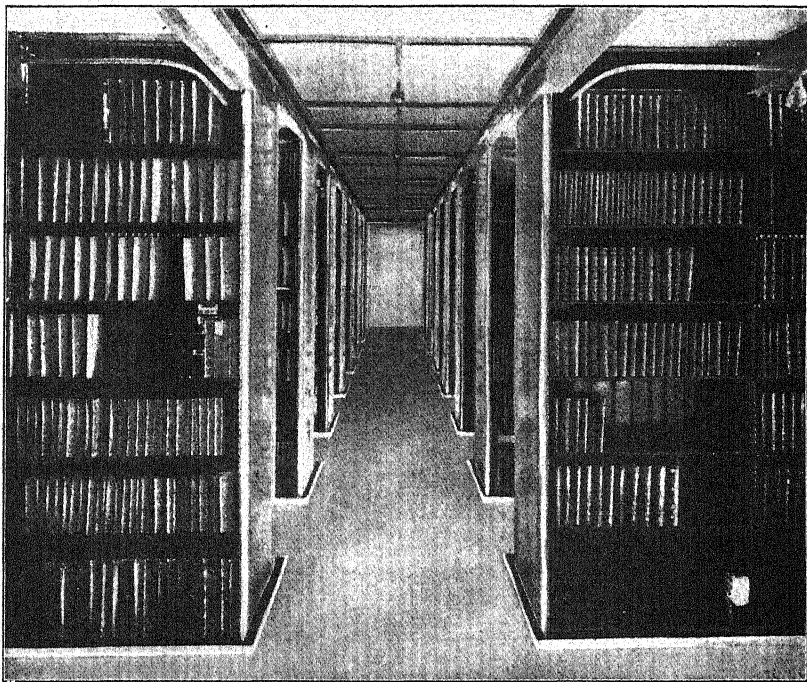


FIG. 66.—Chicago Public Library. Series of book stacks.

ble above, prevent the books from falling down on shelves not entirely full (fig. 65). The space between the shelves is usually about 9 inches. The stacks are entirely open, so that air can circulate freely, which is considered important for the ventilation of the books. Whether experience has shown that books on open shelves are preserved better than those in closed cases is unknown to me. Around the bottom of the stacks (see fig. 66) and along the walls run ventilating slits. Fig. 66 gives a view in a middle passage in the periodical room in the third story. Fig. 67 shows an arrangement with which, by means of extensible grills, single sections can be cut off. Fig. 68 shows a room for folios (the picture represents the room for bound newspa-

pers). Repositories are here provided for folios of the largest size; the books lie upon rollers and slide from right to left, so that any injury to the binding is avoided. This is a very excellent although costly apparatus, especially used in case of valuable works upon art, in which the library is not poor, and which are much used. The wires for electric lights run inside of the book stacks in protected conduits which above are brought out into the aisles and bear the incandescent lamps (see figs. 66 to 68).

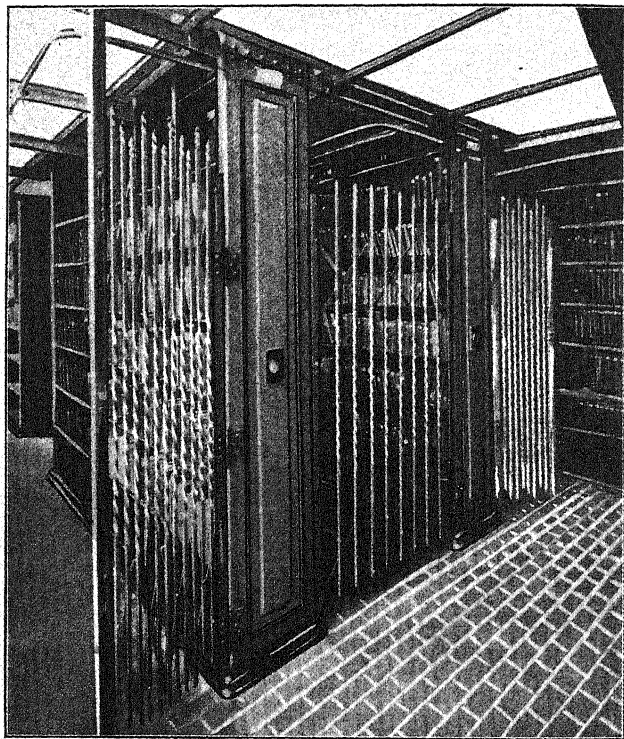


FIG. 67.—Chicago Public Library. Closable alcove.

Elevators driven by electric power carry the books between the repositories, up and down, and into the reading rooms of the third story. On the southwest side of the ground floor are the rooms from which books are sent out to the 65 delivery stations of the city. The book stacks are connected with these rooms by pneumatic tubes of 3 inches diameter, speaking tubes, and telephone, as well as by two service elevators.

The telephone system of the library is very extensive; 24 rooms can be connected with each other, and the head bureaus also, with the city system, through a common switch board placed in the central station of the building, which must in every case be called up. There are

also 29 electrically regulated clocks distributed throughout the library. The electric lighting and all other electric appliances require about 25 miles of wire.

In the year 1900-1901 (the fiscal year extends from June 1 to May 31) there were on hand 272,276 bound volumes and 49,805 unbound pamphlets, as well as over 6,000 duplicates. The following catalogues were kept up with the greatest care: (1) An accession catalogue with running numbers; (2) a shelf catalogue according to a special system founded on Cutter's classification, with letters indicating subjects and with running numbers according to which the books are arranged (the tags are pasted upon the backs); (3) an alphabetical card catalogue of authors, titles, and subjects combined (dictionary catalogue), there being two copies of this, one for the use of the employees

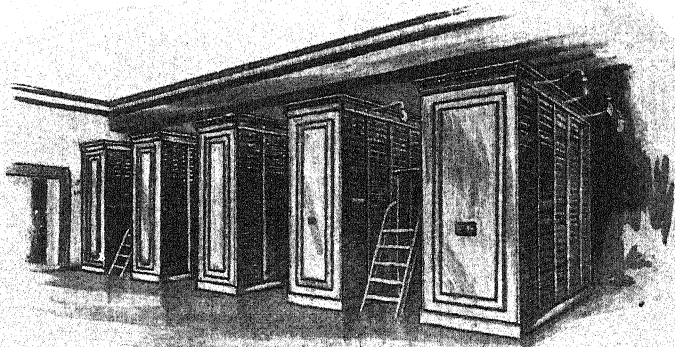


FIG. 68.—Chicago Public Library. Book racks for folios. Each book lies by itself on rollers.

and one for the public, in the room adjoining the book room of the third story. Each catalogue is kept in a wooden case with 500 drawers^a that hold nearly 500,000 cards; 200,000 in each are already in use. The cards for use by the public are perforated and strung on a metal rod so secured (in the well-known manner) that the user can not remove them. The catalogue for use by employees is not so confined. All the cards in use in American libraries are of a uniform size of 3 by 5 inches. In the Chicago Public Library some of the cards are written with the pen, some with the typewriter, but many are bought ready printed. Printed catalogues, which for the small sum of 3 to 15 cents, can be bought in the library itself, and in all branch stations, are prepared for the use of the public.^b

^aSuch card catalogue cases are also made in America, out of iron, especially by the Art Metal Construction Company, of Jamestown, from which the Dresden Zoological Museum obtained a small one.

^bIn his full report Doctor Meyer gives details of the catalogues and statistics of the contents of the library, which are omitted from the present translation.

The public library contains books for home reading, reference works, periodicals, public documents, and books on the fine and decorative arts, the total in 1900 aggregating 258,498 books.

The present book stacks suffice for 300,000 volumes, but about \$11,000 is now being spent in constructing additional ones that will accommodate 90,000 more, and there is room enough for stacks to accommodate 200,000 besides, but if the structure referred to above is built over the west court and the rooms now used by the Grand Army of the Republic become free to the library, the building may contain 2,000,000 volumes. There is, therefore, space available for a long period of future growth.

In the great periodical reading room of the third floor 1,030 current periodicals and newspapers are displayed.

The reference room adjoining is as unrestrictedly accessible as is the large hall. It contains, in its wall repositories, dictionaries, encyclopedias, bibliographies, handbooks, etc. (2,000 volumes in all), that the public can use directly without application at the desk. It is not possible to state how many volumes are here consulted, but it is certainly many hundreds of thousands. In 1900-1901, 121,709 persons visited the reading room and used 336,103 volumes which, at their request, were given to them from the library.

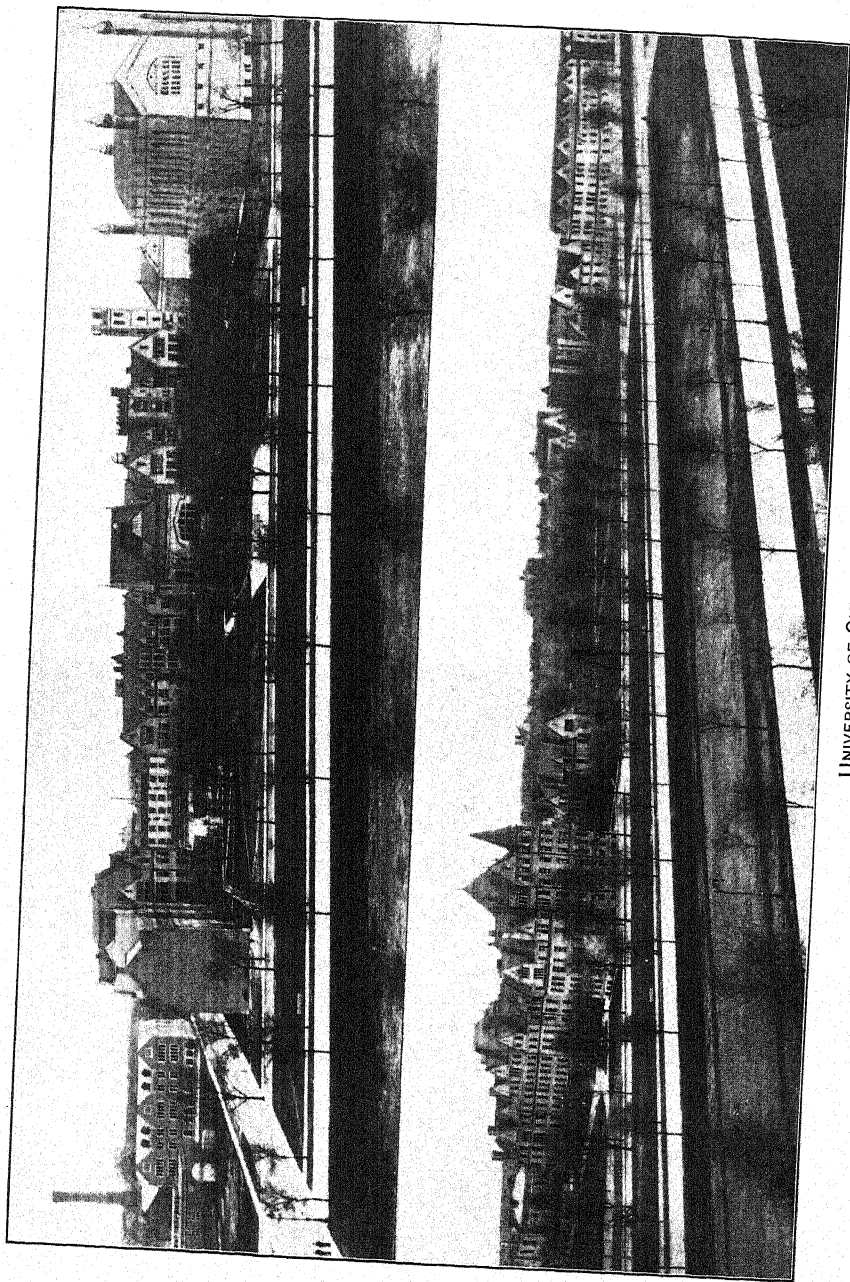
In 1900-1901, 1,772,741 books were lent to 79,605 persons, averaging 5,813 on week days, 284 on Sundays and holidays, the maximum being 10,005 on February 23, the minimum 4,424 on September 12. Sixty-six per cent of these lent books, 1,164,320, came from 65 branch stations in the city.

More than 4,000,000 volumes, including pamphlets, parts of periodicals, and newspapers, are annually used in the Chicago Public Library. In 1900-1901, 1,800,000 were lent out and 600,000 (estimated) were used in the library and its six branch reading rooms. The number of books, periodicals, and newspapers consulted or taken from the open shelves, and of which no record was taken, must be estimated at not less than 1,600,000, based on the number of daily visitors given above.

All of this will give an idea of the all-embracing activity of the public library. That so great an organization, which does so much good, can not be cheaply maintained is obvious. In 1899-1900 the cost of the maintenance, defrayed by the city, was \$263,397. There was paid out for salaries in 1900-1901 the sum of about \$136,000; in 1899-1900 the branch stations cost \$23,717 and the fuel \$8,068.

The library has 208 employees, 59 of whom are women, and include 1 librarian, 1 secretary (also treasurer), 3 assistant librarians 8 heads of departments (circulating, delivery stations, reference, binding, reading room, registry, ordering, patent department), and 110 assistants.

At the head of this powerful and admirable institution is a board of 9 directors. The mayor of Chicago annually names three of these



UNIVERSITY OF CHICAGO.
General view of the University buildings, looking from the Midway Plaisance.

directors, who serve for three years, the appointments being confirmed by the city council. The board of directors reorganizes itself yearly, chooses its president and vice-president and appoints six committees: On the library, administration, delivery stations, buildings and grounds, finance, and by-laws; the secretary of the library acts as secretary to the board. Unstinted praise is due these men, who, with the active staff of the public library, devote their energies to so great a task and solve it in so successful a manner. I am sorry that I am no longer young enough to assist in establishing a similar institution in Germany. In the public library of Chicago one learns how much we have to do in this field. Our schools may be better than those of America; of that, however, I am not in a position to judge; but the means which we furnish adults, by which they can, without expense and without difficult conditions, further educate themselves, are entirely insufficient. We need an intellectual counterpoise for the purpose of freeing men from pot-house living and women from back-stairs literature, and for this a free public library of the best type is a powerful lever.

In my account of the Chicago Public Library I have only been able to touch upon the principal matters, being obliged to omit many interesting and instructive details.

16. UNIVERSITY OF CHICAGO.

[Founded by John D. Rockefeller.]

The University of Chicago was opened in 1892. It possesses a rectangular piece of ground about 35 acres in extent, 2,075 feet long, 875 feet wide, covering six city blocks^a in the southern part of Chicago, between Jackson and Washington parks, distant two-thirds of a mile from the former and one-fourth of a mile from the latter, on the Midway Plaisance, a strip of park that unites the two. The original plans contemplated the establishment of a great museum, but as the Field Columbian Museum arose in the near vicinity, that idea was abandoned and, instead of forming a great collection for public exhibition, it confines itself more to scientific collections for teaching purposes. Those at present provided, independent of the collections of the separate institutions, are displayed in two museums, the Walker Museum and the Haskell Oriental Museum. Both were designed, as were all the buildings of the university,^b by Henry Ives Cobb, the architect of the

^a Now much more, 1903.

^b I could not give all the study to these that they deserved, and have, in the following remarks, consulted the annual registers of the university and the annual reports of the president, as well as an article by Prof. F. Starr, in *Appleton's Popular Science Monthly*, October, 1897, pp. 784-805; also taking from the latter some illustrations. During my visit to the university, as I was endeavoring to obtain some information at the office, a student heard me, constituted himself as my guide and accompanied me everywhere during the whole day. This shows the uncom-

building for the Historical Society and of the Newberry Library (see p. 459), in the English Gothic style, the material being a fine-grained, gray sandstone, the treatment being very pleasing and agreeably diversified, and, in spite of the avoidance of superfluous decoration, not monotonous.

WALKER MUSEUM.

The Walker Museum, named after the donor, is a three-storied building that cost about \$130,000 and was opened in 1893. It lies with its broad sides toward the north and the south, which is unfavorable to the entire south side, for, as an excess of light thus comes from that quarter, the lighting of the cases would be improved if some of the windows were closed. It is seldom that a museum is too well

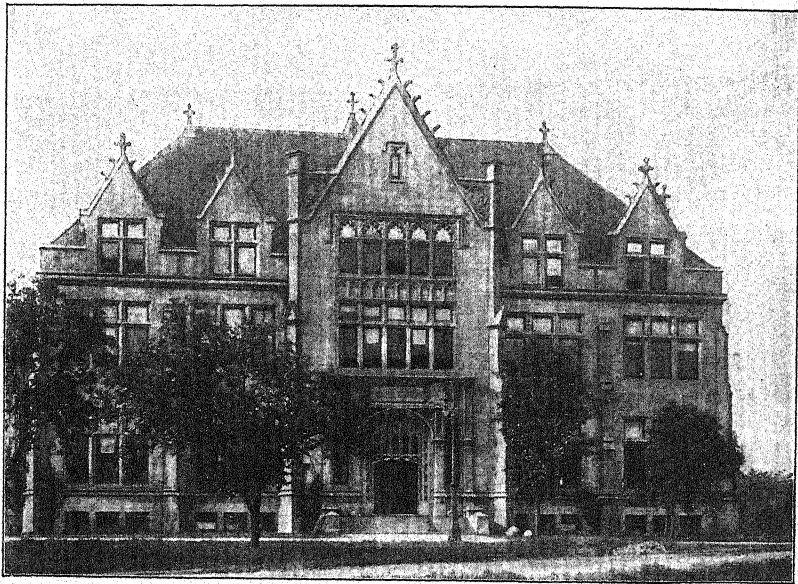


FIG. 69.—University of Chicago. Walker Museum.

lighted. It occurs here because of the narrowness of the window piers and from the circumstance that the principal hall, on the ground floor, forms an undivided room, and therefore the light falls into the relatively small hall from all four sides, thereby causing annoying reflections. The building is fireproof throughout, and is heated by steam from the university plant. The ventilation is insufficient. The cases are of wood, with broad frame work and doors that slide up and down; they are primitive, and not dust proof. A practical arrangement is used for the consultation of maps which are kept in large

monly helpful disposition which characterizes the Americans, and which I have already pointed out at a former occasion. This obliging gentleman was a geologist, a bachelor of science, H. V. Hibbard by name, and I remember with pleasure and gratitude his attentions to me, by which I was saved much time.

drawers that run in grooves screwed upon the inner side of the doors of the cases. These doors open only far enough to make right angles with the case, so that when drawn out the drawer serves as a table.

The museum contains between 400,000 and 500,000 specimens, and is open all day on week days. The collections embrace anthropology, geology, geography, mineralogy, petrography, and historical paleontology (illustration of the succession of the faunas and floras in the history of the earth), with many models, casts, maps, photographs, etc. Upon the ground floor are exhibits relating to the above-named sciences, as well as to Mexican antiquities. Upon the second floor are the collections for study (for the most part in drawers), besides work-

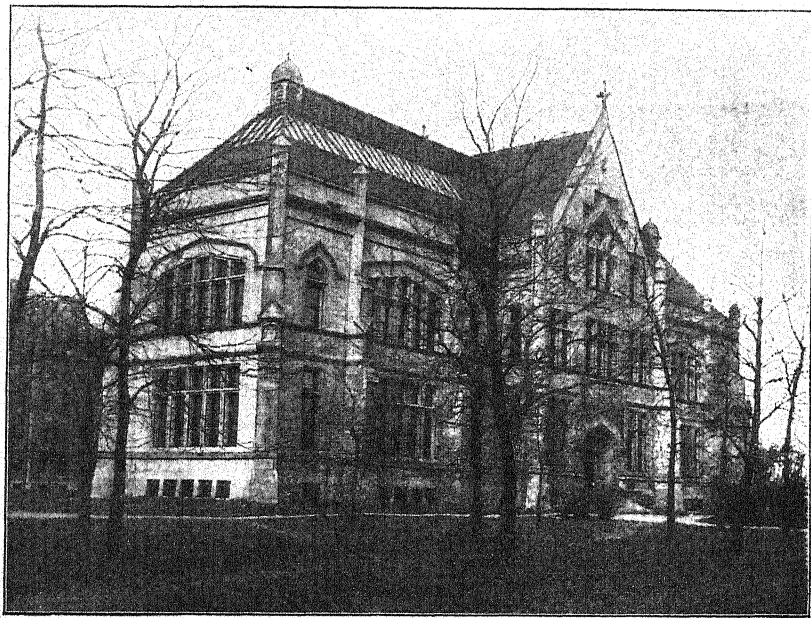


FIG. 70.—University of Chicago. Haskell Oriental Museum.

rooms, a library, and lecture rooms. On the third floor are the collections for study in anthropology, with instruments for measuring, maps and graphic representations relating to the aborigines, with collections from Mexico and Peru, from the pueblos of New Mexico, the cliff-dwellers of Colorado, the Moki Indians of Arizona, the Aleutes, and the northwestern coast of America, Japan, etc.

The museum is managed by the professors of the University, with a few assistants.

HASKELL ORIENTAL MUSEUM.

The Haskell Oriental Museum is dedicated by the donor to the memory of her husband. It is a three-story building, costing \$100,000, and was opened in 1896. At the present time the second floor only is devoted to the museum collections, which include a biblical exhibit;

one of comparative religion; an Assyrian exhibit, consisting mostly of casts, and an Egyptian collection. The objects relating to the Japanese Shinto religion should be especially mentioned, as they are very seldom seen in other museums. The greatest space is devoted to the Egyptian collection, to which new material is constantly being added by the Chicago Society of Egyptian Research, founded in 1897. The lighting of the rooms is excellent, being more satisfactory than in the Walker Museum, as the building lies with its broad sides to the east and west. The remaining stories contain, temporarily, lecture rooms, seminary rooms, library, and the like, but they will later be used for collections. The founder established two lectureships at \$20,000 for lectures on the relations of Christianity to other religions, one series of which is

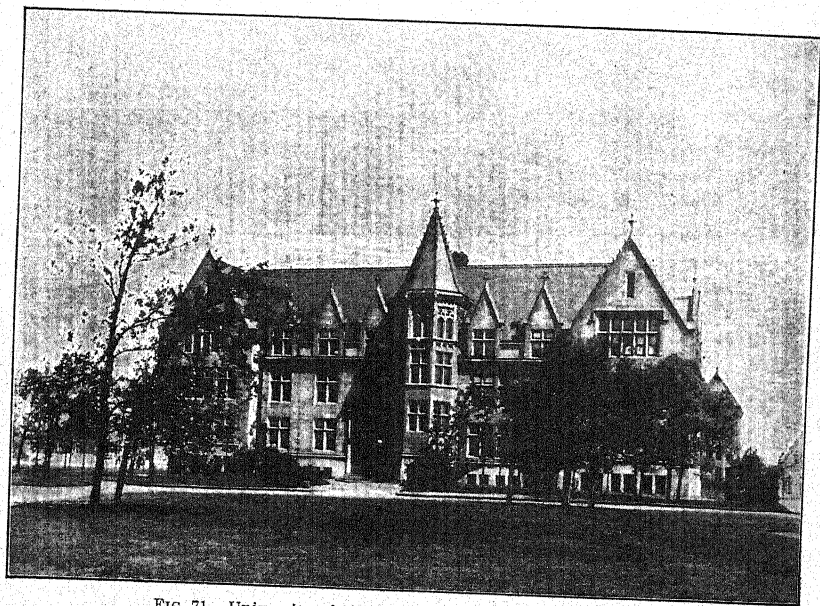


FIG. 71.—University of Chicago. Kent Chemical Laboratory.

delivered annually at the university, the other delivered in alternate years in cities of India. In 1899 the subject for the first was Christianity and Buddhism in six lectures between August 6 and 22.

Because of the recent establishment of all the institutions of the university it follows that they satisfy the most modern requirements and are models of their kind. The buildings are fireproof throughout, but with wooden furniture and stair coverings, as well as wooden door and window casings, which might as well have been avoided, at least in those buildings where there is danger from fire because of the kind of work carried on therein. I must confine myself to brief notices of these several buildings, accompanied by illustrations, for if I were to treat them as fully as they deserve I should far exceed the limits set for this report.

KENT CHEMICAL LABORATORY.

The Kent Chemical Laboratory was named for the donor of the building. It cost about \$240,000, and was opened in 1894. It has three stories. On the ground floor are four lecture rooms, the largest holding 300 persons, a museum, and some workrooms; in the second story there are laboratories for advanced students, and a library. In the third are laboratories for beginners. I mention, in all cases, only the principal rooms. Six private laboratories are provided for the professors and teachers. For ventilation several fans drive in air of a constant temperature below, and one fan expels above.

RYERSON PHYSICAL LABORATORY.

The Ryerson Physical Laboratory was named by the donor of the building in memory of his father. It cost \$225,000 and was opened in



FIG. 72.—University of Chicago. Ryerson Physical Laboratory.

1894. It has four stories, and is of especially heavy and solid construction, in order to diminish tremors. The walls are wainscoted with marble, and the wall shelves of heavy slate on piers of masonry. In the walls and floors are a system of ducts and channels, so that pipes and wires may be laid from one part of the building to another without difficulty. The heating is automatically regulated according to the direct-indirect system. Injurious effects are produced by the engines, three dynamos, and workshops in the basement. On the ground floor are laboratories for advanced students, mechanical workshops, etc. In the west wing are rooms free from iron devoted to

researches in electricity and magnetism. On the second floor there is a large general optical and chemical laboratory, a large lecture hall, and other rooms. On the third floor is a laboratory for beginners, a lecture hall, and other rooms. Here also is provisionally established the mathematical and astronomical department of the university. The central part of the fourth floor forms a hall for experiments requiring a large space. The roof above this is flat and suitable for observation in the open air.

HULL BIOLOGICAL LABORATORIES.

The Hull laboratories (fig. 73) are four buildings, erected according to a common plan, connected partly by covered cloisters, and forming



FIG. 73.—University of Chicago. Hull biological (physiological and anatomical) laboratories.

three sides of a large court. They were given by Miss Helen Culver and named in memory of her uncle. They were opened in 1897. In the letter of presentation it was said that the whole sum of \$1,000,000 should be devoted "to the increase and spread of knowledge within the field of the biological sciences," and that a portion of it should be applied for sustaining an inland experimental station and a marine laboratory and to the regular delivery of popular lectures upon the advances of science in sanitation and hygiene. It was also provided that only one-half of the sum should be used for the erection of buildings, but that the interest on the other half should be applied to the support of research, instruction, and publication. In accordance with this plan a zoological, a physiological, an anatomical, and a

botanical institute have been built, each specially adapted to its own ends, and it should be particularly mentioned that the architect has not allowed himself to sacrifice either space or light to the requirements of the Gothic style. The open side of the court is turned toward the center of the University grounds.

The *Hull Zoological Laboratory*, shown in fig. 74 on the left, has four stories, 130 feet long and 55 feet deep. In the basement there is an aquarium, vivaria, preparators' workrooms, and the like, as well as a room for paleontological material, as paleontology in the Chicago University, is distributed in a rational and progressive way among the biological sciences. On the first floor is a museum, a general biological library, and the laboratory for beginners. On the second floor are only zoological laboratories. Upon the third floor there is a laboratory for comparative anatomy and embryology and one for cellular biology, as well as single zoological workrooms. Upon the fourth floor are laboratories for bacteriology, as well as rooms for paleontology.

In summer, work is also carried on at the marine biological station at Woods Hole, Massachusetts (Marine Biological Laboratory), which is allowed the pupil in reckoning his prescribed hours of work, although the station is not ranked as belonging to the Chicago University. The director of the zoological laboratory of the university is also director of the Woods Hole station, which is an hour and a half

"During my visit there were undertaken here extensive researches, begun in the early part of 1899, upon the water of the Mississippi, and the Illinois and its tributaries, as it was desired to discharge the sewage from Chicago by that route. Up to that time it had been discharged partly through the Chicago River into Lake Michigan, which not only changed that river into a reeking sewer but also polluted the potable water supply of the city. In spite of the fact that the lake water was pumped from the lake, 4 miles away, through subterranean channels, Chicago remained unhealthy, with frequent cases of typhoid fevers and other diseases. Now, through a canal 30 miles long, reaching as far as Lockport, a union has been effected with the Desplaines River, and through that with the Illinois and the Mississippi, and the city thus freed from noxious materials without, it is alleged, injuring the dwellers upon the other rivers, as the sewage is extraordinarily diluted by bringing the water of the lake into the canal (11,000 cubic yards a minute, which could be raised to 22,000 cubic yards). The question has even arisen whether, through this enormous withdrawal of water, the level of the Great Lakes will not become permanently lowered, so that the shipping interests, which are very active, may be injured thereby. The canal, which was finished in seven years and opened in 1900, also serves for ship transport. It is 175 to 317 feet broad, from 16 to 22 feet deep. It cost the city about \$35,000,000, but this was not too high a price to pay for the benefit which it wrought. The Hull Bacteriological Laboratory has been especially adapted for this task, and has, among other things, already undertaken a great number of chemical and bacteriological researches in order to prove whether any appreciable effect will be produced by the introduction of the diluted sewage into the canal and the great river system involved.

by rail from Boston, therefore more than a twenty-four hours' journey from Chicago. It is supported by several universities of the United States and publishes, among other things, biological lectures of a more or less popular character, which are given there. The U. S. Fish Commission of Washington also has a station at Woods Hole.

The *Hull Botanical Laboratory*, shown at the right in fig. 74, has four stories, and is 112 feet long and 56 feet wide. The rooms of this building are also especially well lighted. The greenhouse is 75 feet long, 33 feet wide, and easily reached by an elevator. It affords space for growing plants under different conditions (tropical, arctic, desert, aquatic) in order to experimentally determine their influence over the organism. The temperature and moisture can be exactly controlled. Underneath, in the fourth story, are rooms chiefly for the study of plant physiology, a chemical laboratory, a workshop, and others. In

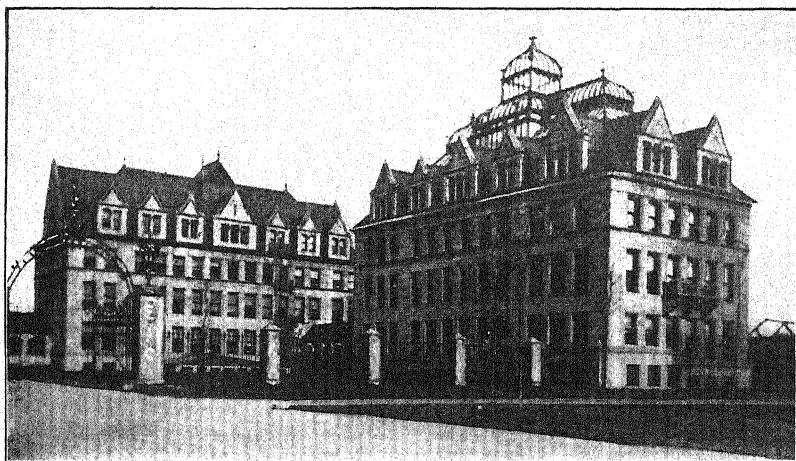


FIG. 74.—University of Chicago. Hull biological (zoological and botanical) laboratories.

the third story are studied the taxonomy and morphology of cryptogams. In the second story are the great herbarium, an excellent library, laboratories, etc., and on the ground floor the lecture rooms and the large general laboratories for beginners. Parts of the basement and of the ground floor are temporarily occupied by the printing establishment of the university.

The *Hull Physiological Laboratory*, seen in fig. 75, has four stories, is 112 feet long and 55 feet wide, and is connected with a greenhouse for the rearing of insects and plants. In the basement are a cold-storage room, a marine aquarium, a vivarium with excellent appointments, a workshop, etc. On the first floor is the laboratory for beginners, a lecture room, a photographic room, and galvanometer room. In the second story is the large lecture hall, with a practical arrangement for lantern projections, the library, an optical room, two

dark rooms with heliostat, prisms, etc., for the purpose of studying the effects of monochromatic light upon living organisms, etc. In the third and fourth stories are laboratories for physiological chemistry, vivisection rooms, etc. In the institute special attention is given to the study of comparative physiology, and the completeness and excellence of its appointments for this purpose can not easily be surpassed.

The *Hull Anatomical Laboratory* has four stories, and is 131 feet long and 55 feet wide. The studies here embrace human anatomy, histology, histogenesis, microscopic anatomy, embryology, and especially neurology and experimental psychology. In the basement is a cold-storage room, a crematory, a bone room, etc. The first story is devoted to psychology, with a collection of instruments that cost

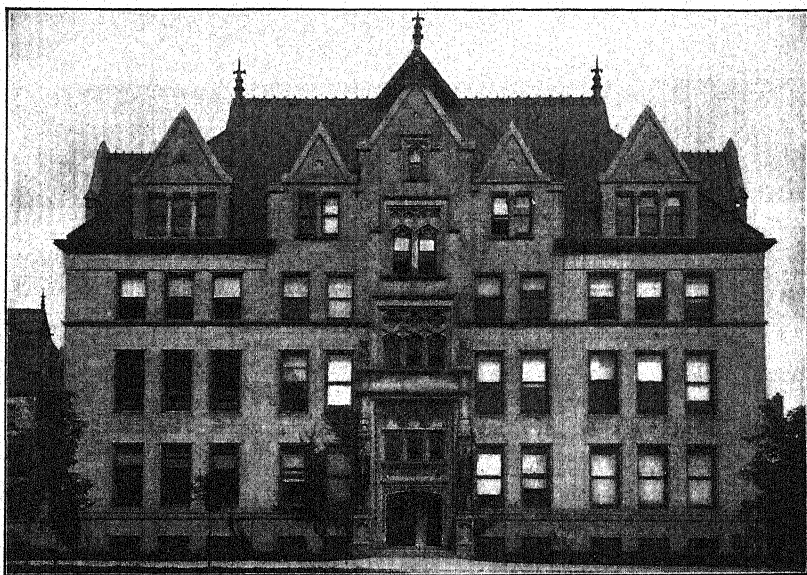


FIG. 75.—University of Chicago. Hull Physiological Laboratory.

over \$2,000, among which are instruments of Helmholtz, Du Bois-Reymond, Ludwig, Hering, Kühne, Ewald, König (I cite only a few Germans), and many others, and to histology. There is also a photographic workroom, etc. In the second story are other rooms for histology and neurology, which is here especially cultivated. In the third story is a large lecture hall and dissecting rooms for human anatomy. In the fourth story is a vivarium and laboratories for special research.

YERKES ASTRONOMICAL OBSERVATORY.

The Yerkes Observatory is situated about 75 miles from Chicago on Geneva Lake, Wisconsin, and about 1½ miles from Williams Bay, a little town on the lake. It was founded in 1894 by Charles T. Yerkes,

at a cost of \$300,000 and was opened in 1897. In spite of its youth it has already obtained a world-wide reputation under the direction of Prof. G. E. Hale. As I have not visited it I can only give a notice compiled from various sources. As early as 1892 Charles T. Yerkes conferred with Messrs. Harper and Hale concerning its foundation, and the latter in 1893 had the plans drawn up. The site was selected with care so as to be as free as possible from disturbances. It is 220 feet above the lake and 1,300 feet above sea level. About 50 acres of woodland are included in the site. The building, likewise designed by Henry Ives Cobb, is T-shaped, its principal axis (361 feet) lying east

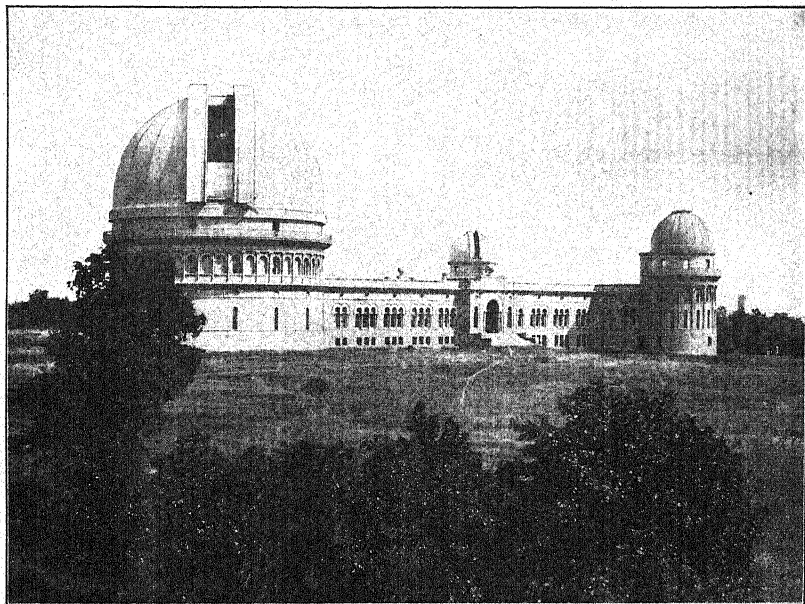


FIG. 76.—University of Chicago. Yerkes Astronomical Observatory.

and west. The dome for the telescope, which is 75 feet long with an objective of 33 inches, is at the western end and is 98 feet in diameter. This great telescope^a is moved by an electrical apparatus, and the floor of the observing room, 82 feet in diameter, can be elevated and is movable through a range of 26 feet by means of electrical motors (fig. 77). A spectrograph, a photoheliograph, as well as a stellar and a solar spectrograph are attached to it. In the eastern wing, which runs north and south, is the heliostat room, 108 feet long and 13 feet

^a It was exhibited in Chicago in 1893, and was until up to within a short time the largest in existence. One was made for the Paris exposition of 1900 having an objective 1.25 meters in diameter, and recently an American has offered one to the Pope that is still larger.

wide. The central body of the building contains a library, a lecture room, laboratories, photographic rooms, offices, etc. In the basement also are similar rooms, as well as an excellently equipped workshop. The power house is isolated from the observatory.

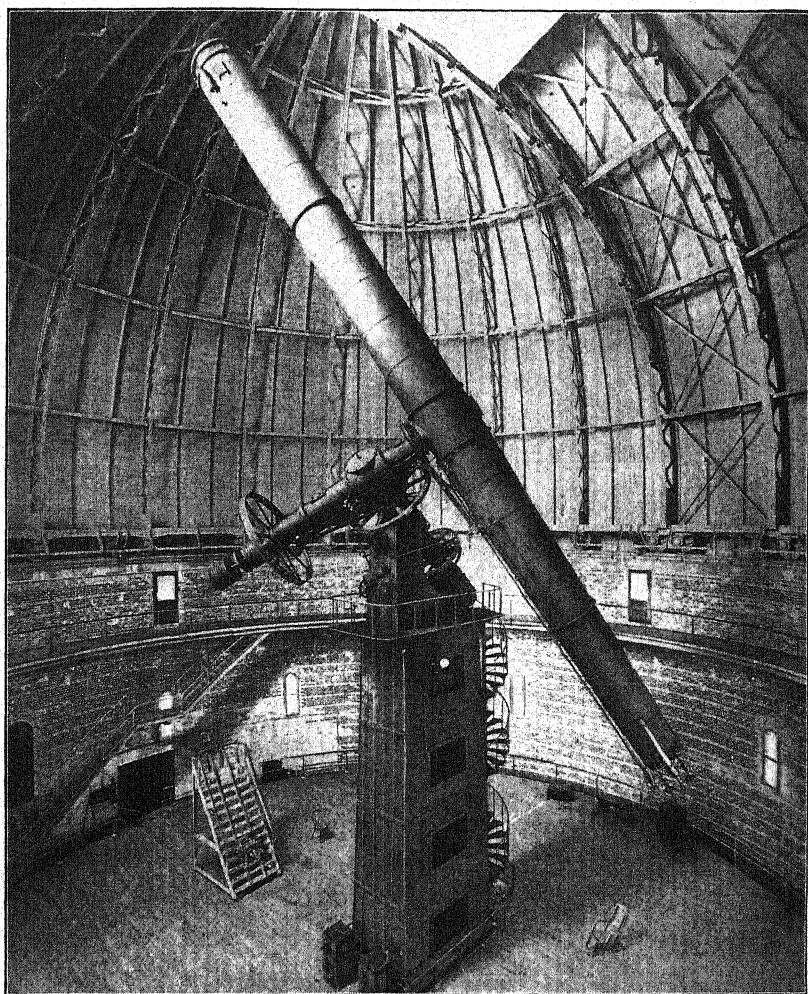


FIG. 77.—University of Chicago. The great telescope at the Yerkes Observatory.

Besides this the university has within its own grounds at Chicago a small astronomical observatory for the instruction of beginners, and about a mile and a half north of it in the city a second one, the Kenwood Observatory, for the instruction of advanced students in physical and practical astronomy and astrophysics, for which it is completely equipped.

LIBRARY.

Since 1893 the library has been temporarily installed in a nonfire-proof building,^a situated in the northeast corner of the university grounds. This is entirely insufficient and extraordinarily crowded, so that the building of a second temporary building was contemplated when J. D. Rockefeller, on Christmas eve, 1900, made a preliminary donation of \$100,000 for a new structure. The university had already, in 1891, bought for about \$17,000 the Calvary secondhand bookstore in Berlin, which was estimated to contain 280,000 volumes and 120,000 pamphlets, but was indeed much less and not as valuable as was expected; and it had also obtained in 1891 the entire library of the Baptist Union Theological Seminary, of Chicago, in 40,000 volumes. In 1899 the entire number of books possessed by the university amounted to 325,000 volumes^b and 150,000 pamphlets (estimated), 71,235 volumes of which were in the 25 departmental libraries of the various institutes and seminaries, where, however, they are administered from the central library by a superintendent, an inspector, and four assistants. These reference libraries are completely catalogued according to authors and partially according to subjects. They contained in gross, in 1900, the following numbers of volumes: Theology, 9,350; biology, 7,685; political economy, 6,181; English, 5,432; history, 5,433; German, 4,920; Latin, 4,415; geology, 4,260; sociology, 3,703; philosophy, 2,914; romance languages, 2,905; political science, 2,651; and mathematics, 2,503.

COBB LECTURE HALL.

The Cobb Lecture Hall (fig. 78) was founded in 1892 by S. B. Cobb, at a cost of \$225,000. A structure for a lecture hall was already in process of erection, so that on October 1 of that year the official opening of the university was celebrated in it, and it has remained its central point. It is 170 feet long, 82 feet wide, and 55 feet high, up to the roof. There are 23 lecture halls that hold a total of 800 persons—the largest, 78 by 45 feet, holding 400 persons; the second in size, 45 by 33 feet—besides the offices of the university. It is about to be united with the central heating plant.

GYMNASIUM.

The gymnasium is a temporary structure that in 1892 was built on the north, near the built-up portion of the university grounds, at an expense of about \$18,000. The portion for men is 220 feet long and 55 feet wide, the hall 154 feet long by 55 feet wide; 420 lockers serve for depositing clothing. There is a running track 440 feet long, laid with linoleum. The portion for women is 100 feet long and 55 feet

^a Only 20,000 of the most valuable volumes are stored in a fireproof room.

^b In 1903, 367,442 volumes.

wide, of which 55 by 33 feet is devoted to bathrooms, dressing rooms, lockers, etc. The women's portion is to be torn down, as the site is assigned to a students' clubhouse and mess house. A special room serves for the physical examination of students, which is obligatory, and also for a library. The university physician not only continually supervises the hygienic appointments of all the buildings and the state of health of the students who consult him without charge, but he also informs himself especially as to their physical condition for intellectual work. Although the appointments of the gymnasium are good in themselves and compare well with those of Germany, yet they are by far unequal to those of Columbia and other American universities, and the new building for which A. C. Bartlett has recently given \$200,000^a

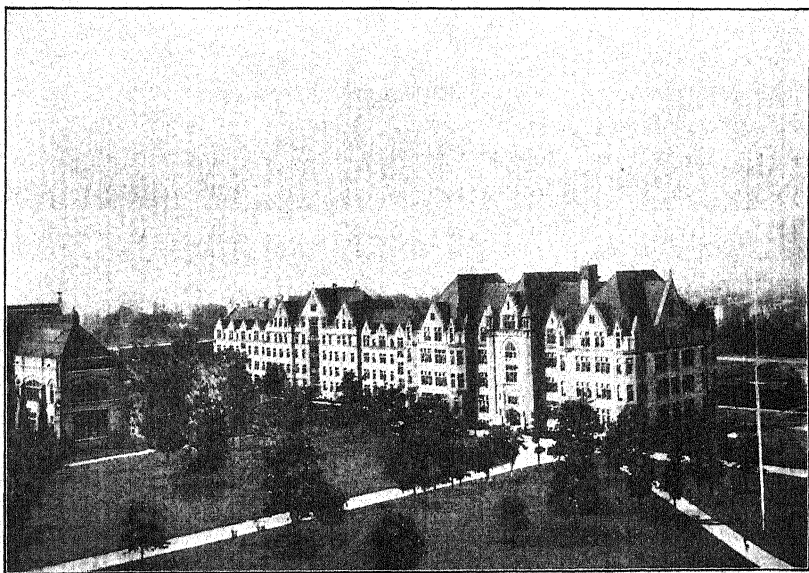


FIG. 78.—University of Chicago. Cobb Lecture Hall.

is anxiously awaited.^b The gymnasium is open week days from 7 a. m. to 7 p. m.; on Sundays it is closed. Varied gymnasium exercise, one-half hour four times a week, is required of all undergraduate students, both male and female, independently of the athletic games. The athletic field adjoins the university grounds on the north and occupies an entire block. The organization of the university division of

^a *Science*, August 2, 1901, p. 192.

^b It will be ready for occupancy in October, 1903. The building and equipment will cost over \$250,000. The building is 200 feet long by 80 feet wide. The swimming tank is 60 by 28 feet. A gallery with seats for 200 persons overlooks the water. A 12-foot running track, with 13 laps to the mile, extends around the walls, 12 feet above the floor.—1903.

physical culture and athletics is a widely embracing one, corresponding to the great part which athletic games play in American universities, too great, as appears to me,^a in comparison with the too slight part given to it in Germany. In spite of the considerable receipts of the division, amounting to about \$35,000, of which about \$30,000 alone were derived from admission fees to the football games, paid by the public, there was in 1898-99 a deficit of \$250.

POWER HOUSE.

A central power house for heating and for electrical supply was erected as long ago as 1892 alongside the university grounds, separated from them by a street. It is 131 by 138 feet in size. The engines are fed by coal oil provided by J. D. Rockefeller, the founder and chief supporter of the university. The present house is, however, no longer sufficient, and there has been begun the construction of a new larger central power house for electricity, heating, and water, from which subterranean conduits will be led to all the buildings of the university. It will be 300 feet long and 50 feet wide at the ground level, with a chimney stack 145 feet high, and will include a workshop for repairs. It will contain, among other things, an electric crane, for handling of coal and the like, that can be moved along the entire building.^b

DORMITORIES.

The outer fronts of the four corners of the four southern blocks of the university grounds, taken as a whole, are devoted to dormitories. Here they stand, isolated, with great lawns that serve as playgrounds, the quadrangles in front planted with trees and decorated with beds of flowers. Only one portion is now built. There are four such quadrangles—one for women and one for graduate students, and two for the undergraduates. The row of houses in fig. 79 represents some of the dormitories for male students. On the right hand (near the Cobb Lecture Hall, fig. 78) is the north hall, especially for graduate students, and therefore formerly called the graduate dormitory. This row of houses corresponds to those seen at the left in Plate 32. Up to the present time there have been established four dormitories for men and four for women, the former being able to accommodate 236, the latter 220 students, a total of 456. The number of students in the university in the year 1899-1900 was 1,734 men and 1,449 women, a

^aSee also A. Bates: *The Negative Side of Modern Athletics*, *Forum*, May, 1901, pp. 287-297. In the summer of 1900 one of the track teams of Chicago University went to Europe in order to take part in the international contests which were held in London by the English and in Paris by the French.

^bThe new power house is now ready (1903).

total of 3,183, and in 1900-1901 there were 3,612, but it should be remembered that the maximum number of resident students at any one time during the latter year was only 2,000.



FIG. 79.—University of Chicago. Hitchcock Hall. Dormitory for male students.

The university builds and manages the dormitories and rents the rooms to the students. Within the dormitories there is, however, an official superintending organization called the university houses and bearing the name of the dormitory, as Snell house, Green house, South divinity house, North house, etc. The term "house" is generally



FIG. 80.—University of Chicago. Dormitories for female students.

used for dormitory instead of hall. All the inmates of a dormitory make up such a house, which has a head appointed by the president of the university, a woman in the case of the women's houses.^a

^a In his original report Doctor Meyer gives interesting details in regard to the social life of the students which are omitted from the present translation.

The yearly expenses of maintenance at the University of Chicago are officially stated at \$287 for a minimum and \$655 as a liberal allowance, \$396 as an average for thirty-six weeks' work. The honorarium for tuition is always the same, \$120, the price for rent and care of room varies from \$42 to \$225, the board from \$100 to \$225, laundry from \$15 to \$35, text-books and stationery from \$10 to \$50. Still one may live more cheaply, for a room near the university may be had for \$1 a week, including heating and lighting, or with board for \$4.50, and board alone in student clubs for \$2.75 to \$3.50 a week.

I may also mention that the house of the president of the university stands near the southwestern corner of the grounds, therefore near the dormitory for women (extreme right of Plate 33). The president holds regular receptions, whereby the social life of the university is kept up.

As appears from the plan of the buildings of the university grounds and their vicinity, which is attached to the annual register, it was the intention to line the four blocks originally assigned to the university somewhat symmetrically with buildings.

In the middle transverse zone is the university hall and library,^a together with the chapel; at the four corners are the dormitories, with large rectangular lawns in front of them; in the middle longitudinal zone are variously shaped large, ornamental plots; and the remaining portions are more or less symmetrically filled with buildings of which there were 52 planned in all. Besides some provisional structures and the observatory at Lake Geneva, 17 of these have been completed, namely, 2 museums, 6 natural history institutes, 1 lecture hall, 8 dormitories; 21 are contemplated or in course of construction, 3 for modern, 2 for ancient languages, 1 for geology, 1 additional museum, 2 additional lecture halls, 7 more dormitories (one in course of construction), a hall with a library, a dining hall (building), the chapel, the gymnasium (building), the power house (building), and finally 14 whose special purposes have not yet been determined. In this original scheme of buildings, however, there are not included the two northern blocks, which, in 1899, Mr. Marshall Field, together with Mr. J. D. Rockefeller, presented to the university at a cost of \$330,000. But after the Rush Medical College,^b that is to say, the medical school, with nearly 1,000 students, which up to this time, situated in West Chicago, has been only externally associated, has begun to settle down with the university,^c and, further, after the Pedagogical Institute of Chicago, funded with \$2,000,000, has been transferred to the university,^d a rapid advance will probably be made in the erection of addi-

^a This plan has since been abandoned.

^b According to *Science*, May 3, 1901, p. 720.

^c Compare also the President's Report 1898-99, p. xix.

^d *Science*, March 3 and 15, 1901, pp. 400 and 440.

tional buildings, if, indeed, this has not already occurred, for in Chicago matters develop so quickly and unexpectedly that descriptions frequently fall short of the reality.^a

HISTORY OF THE UNIVERSITY.

If we take into account the buildings and installations established, created from nothing, since 1890, when the university was planned, up to 1899, we can only regard with astonishment the "phenomenally rapid growth" of Chicago University, as it is generally spoken of; yet those far-seeing men at its head have still greater aims in view which they will also attain.

The University of Chicago is all-embracing in the sense that it seeks to compass for both sexes the entire, broad domain of knowledge from the elementary school up to induction into independent research. But before I attempt to sketch its complicated organization, which differs in many points from that of other American universities, it may be proper to review its brief and eventful history, especially with regard to certain outside matters.^b

A "University of Chicago" was founded as long ago as 1857, but it was obliged in 1886 to close its doors on account of financial difficulties. It sprang from the bosom of the Baptist Church, which also again took steps for the founding of a new university. In 1888 J. D. Rockefeller, of New York, conferred with Dr. W. R. Harper, professor of Semitic languages at Yale University, New Haven, Connecticut, in regard to the reestablishment of the university in Chicago, as this appeared to him the duty of the Baptist denomination of the country, and also entered into communication with the American Baptist Educa-

^a How true this remark is may be illustrated by the fact that while I was revising my manuscript (in July, 1901), I received news from President Harper that corner stones for the following buildings had recently been laid: The press building, a dormitory for undergraduates (Hitchcock Hall); the university dining hall, with its kitchen; the University tower; the clubhouse for university students, an assembly hall (Mandel assembly hall) and the school of education. I also learn from newspaper notices, that L. Mandel, of Chicago, gave \$100,000 for the assembly hall; J. J. Mitchell, of Chicago, \$50,000 for the tower; the executors of J. Reynolds, in Chicago, \$80,000 for the clubhouse, and a great business man, who wishes to remain anonymous, \$100,000 for the dining hall. The school of education will cost \$1,000,000.

^b In 1897 H. Moissan wrote a brief sketch of the University of Chicago, which was translated and published in the Report of the Commissioner of Education for the year 1897-98 (Washington, 1899), II, pp. 1443-1447. He there relates, among other things, that a professor at a university, without any ceremony, presented him from the collection a piece of fossil wood that pleased him, and that was neither numbered nor catalogued. He instinctively looked around to see if they were observed. He adds: "It is only in America that one sees such things." With regard to this I might properly say that one will hardly find anywhere such careful cataloguing as in the American museums, and that if that professor gave him the specimen he was doubtless authorized to do so.

tion Society, which was founded in Washington in 1888. The result of the conferences which the society carried on was that in 1889 Rockefeller contributed \$600,000 as an endowment fund, the income only of which could be used for current expenses, and under the condition that within a year \$400,000 should be given by other parties for the purpose of purchasing land and erecting buildings thereon. This condition was fulfilled in 1890, and in addition Marshall Field, of Chicago, presented land for half of the site, the other half being bought for \$132,500, altogether three blocks, to which, in 1891, a fourth block was added, costing \$150,000, and in 1898 a fifth and sixth block, costing \$340,000, toward which Mr. Field again contributed \$135,000 and Mr. Rockefeller the remainder. The cost of the land aggregates, therefore, up to the present time, over \$750,000.

On September 10, 1890, the University of Chicago was incorporated as such by the State of Illinois, its objects, as set forth, being to serve for the higher education of both sexes on equal terms, its management being confided to a board of 21 trustees, two-thirds of whom, as well as the president of the university, must be members of regular Baptist churches, the university to have, however, a purely literary and scientific character, and no professorship or place of any kind to be dependent upon a religious test. A few days thereafter Mr. Rockefeller again gave, to be invested, \$1,000,000, four-fifths of the proceeds to be used for the general purposes of instruction and one-fifth for the theological faculty, and Prof. W. R. Harper was appointed president. The latter accepted the office on July 1, 1891, and has ever since been the active force of the whole enterprise, as in fact he had been since 1888, constantly maintaining the view that it ought to be a real university and not a nominal one, as are so many in the United States. It was further arranged that the Theological Seminary of the Baptist Union in Morgan Park, Chicago, established since 1860, be constituted the theological faculty of the university (divinity school) under this condition, among others, that a dormitory costing \$100,000 should be erected for the accommodation, without charge, of the theological students, in consideration of which the academy of the university should be established in the buildings at Morgan Park. With the seminary the university also obtained a theological library of 40,000 volumes, as previously mentioned.

From January, 1891, to May, 1892, there were six bulletins published on the plan of organization of the university which had been previously submitted to the criticism of more than 50 American institutions for higher education. In 1891 the heirs of the first mayor of Chicago, W. B. Ogden, endowed a faculty of natural sciences (Ogden Scientific School) for physics, chemistry, biology, geology, and astronomy. This was under a provision of his will that prescribed that 70 per cent of his property should be devoted to charitable purposes.

Up to 1898 \$300,000 of this had been liquidated and \$200,000 more are expected. In the same year occurred the purchase of several hundred thousand books and pamphlets comprising the library of the Calvary Antiquariat at Berlin. In 1892 S. A. Kent, of Chicago, gave \$235,000 for a chemical laboratory, Mr. Rockefeller another endowment of \$1,000,000, and Mr. Field \$100,000 for buildings, under the condition that within three months an additional sum that should raise the total to \$1,000,000 should be secured for the same object from other parties. This was done in Chicago itself; the sum was even exceeded, and many complained that they had not been asked to contribute. S. B. Cobb had given \$150,000 especially for a lecture hall; G. C. Walker \$130,000 for a fireproof museum; M. A. Ryerson \$150,000 for a physical laboratory (to which he added in 1894 \$75,000 more) and \$50,000 besides; Mrs. N. S. Foster gave \$60,000; Mrs. E. Kelly and Mrs. J. Beecher each \$50,000, and other ladies \$18,000, all for dormitories for women; Mrs. A. J. Snell \$50,000 for a dormitory for young men students, and in addition to this there were 20 leading business men of the city who together guaranteed \$100,000 in case the required sum was not forthcoming.

In order to show the farsightedness that animated the men of the university, I will mention that in June, 1892, when there had already been a large staff of teachers appointed, though as yet there was not a single student, and when everyone had his hands full with organization and installations, \$250 was granted for the American School of Classical Studies at Athens.

On October 1, 1892, the university was opened to students with a ceremony exclusively of a religious character. Only the lecture hall and three dormitories were ready; for everything else rooms had to be rented in the neighborhood. As a slight recognition of the indebtedness which was felt toward Mr. Rockefeller it was voted that the words "Founded by John D. Rockefeller" be added to all official reports, publications, and correspondence of the university. In the same year this founder gave still another sum of \$1,000,000 as an endowment for the compensation of instructors. On January 1, 1893, the university had a teaching corps of 172 persons, of whom there were 73 professors (4 German) and 61 fellows for 594 students, nearly one-fourth of them being women. In 1893-94 a fund amounting to \$1,000,000 was formed for the general equipment of the university, of which Mr. Rockefeller contributed half, M. A. Ryerson, of Chicago, \$100,000, the remainder coming from various sources. In 1894 Mrs. C. E. Haskell, of Chicago, established an oriental museum at a cost of \$100,000, adding \$40,000 for lectures on comparative religion, and Charles A. Yerkes, of Chicago, founded an observatory with \$300,000. In 1895 the total number of students was already more than 2,000. From 1893 to 1896 Mr. Rockefeller had given for various purposes,

besides the bequests already mentioned, \$400,000, and in 1895, for the fourth time, he made an endowment of \$1,000,000, and promised \$2,000,000 additional in case a like sum was contributed from other sources by 1900; and this was also done.^a Further, Miss H. Culver, of Chicago, in 1895 gave \$1,000,000 for biological sciences (see above, p. 496), and Mrs. A. Hitchcock, of Chicago, gave in 1900 \$200,000 for a dormitory for young students and the endowment of professorships. The gifts in the year 1898-99—the school year runs from July to July—reached a total of nearly \$750,000, \$500,000 of which were from Mr. Rockefeller. Besides his \$2,000,000 gift which was due April 1, 1900, he gave in the same year another \$1,000,000 for capital stock and \$500,000 for immediate use, with the desire that \$100,000 of it should be employed for a building for the library and press. In all, the university had obtained up to the end of 1900,^b \$13,000,000 from private subscriptions,^c but not a penny from the city, State, or General Government; of this amount Mr. Rockefeller alone has given \$9,000,000, and all but \$1,000,000 of the remainder he has in a manner incited, in that a condition was attached to his gifts that such and such sums must be raised from other sources.^d In 1899,

^a Concerning this transaction the most fantastic statements were published in the German papers. Thus, a Berlin paper informed its readers that the university would have been bankrupt had not this sum been forthcoming; a Dresden one, on the contrary, said that President Harper raised it in twelve hours, while he had been four and one-half years doing so, even this being a most astonishing performance.

^b See *New York Weekly Tribune*, December 20, 1900.

^c At the decennial celebration held June 18, 1901, President Harper said, among other things, that while one could see now what it was possible to do with \$10,000,000 to \$12,000,000 for the establishment of an institution for higher education, yet before half of the new century had elapsed the world would know what \$50,000,000 could do for that purpose. (*Chicago Record-Herald*, June 19, 1901, p. 2.)

^d Besides, Mr. Rockefeller by no means confines his benefactions to the University of Chicago, and by his example has perhaps done more than by his gifts themselves. Quite recently Andrew Carnegie, of Pittsburg, has surpassed him in gifts for educational purposes (see p. 474), crowning these during this year (1901) by giving to the four universities of his native land, Scotland, \$10,000,000 in order to elevate them and to assist the students. In 1902 Carnegie gave the same sum for an Institution for Scientific Research in the City of Washington, 1903. John D. Rockefeller was born in 1839; his father was already living in the United States. Disparaging statements are made here and there as to the way in which he acquired his wealth (for example by F. de Norvins: *Les Milliardaires Américains*, Paris, 1900, p. 100 et seq.), but more shrewd than the robber knights of the middle ages, to whom many of our first families owe their wealth, he has certainly not kept up his practices, and it can therefore likewise be said for him: non olet. In America to-day a rich man may not keep his money or leave it chiefly to his relatives. Public opinion compels him to other methods of disposal. In Boston it is epigrammatically said that no one would dare to die without leaving something to Harvard University, and a minister in Brooklyn humorously remarked that he would not preach the funeral sermon of any rich man until he knew what his will was. It is unjust to inveigh against great fortunes when their possessors support our hospitals, libraries, and universities (see *The Justification of Wealth* in *The Nation*, LXX, 1900, p. 66).

\$5,500,000 of the total fund of \$13,000,000 were invested, yielding a secure annual income of \$210,000, or 29 per cent, toward the payment of the total expenditures of \$730,000, the students contributing \$270,000 (37 per cent), while Rockefeller gave \$200,000 (28 per cent), and the small remainder was derived from various sources. The expenditure for salaries of the instructors was, in round sums, \$390,000 (54.7 per cent), stipends^a \$60,000 (8.5 per cent), for printing and publishing \$50,000 (6.8 per cent), for expenses of buildings and grounds \$83,000 (11.5 per cent), for books \$14,000 (1.9 per cent), the remaining 16.6 per cent for general expenses.

According to a statement which occupied almost an entire closely printed folio page of the *Chicago Tribune*, January 1, 1901, p. 17, there was given by private persons in the United States in 1899 \$80,000,000 for educational purposes, libraries, museums, charitable objects, churches and religious enterprises, as well as to cities for the public benefit and entertainment, sums under \$1,000 not included. In 1900 the total was \$62,500,000, of which there was applied to educational institutions, museums, and libraries \$40,000,000, Washington University, in St. Louis, obtaining \$5,000,000, the Carnegie Museum, in Pittsburg, \$3,500,000; the University of Chicago, \$2,600,000; Clark University, in Worcester, Mass., \$2,400,000; Yale University, in New Haven, \$1,300,000; Brown University, in Providence, \$1,000,000; the Cooper Union, in New York City (see p. 366), and the University of Syracuse each \$830,000; Harvard University, in Cambridge, \$730,000; Drake University, in Des Moines, \$530,000; Columbia University, in New York, \$500,000, and so on. During the year 1901, besides the donations amounting to \$1,300,000 already mentioned, there were known to me the following great gifts from Chicago alone: Dr. D. K. Pearsons, who from 1890 to 1900 had already given \$2,500,000, almost wholly for educational objects, in sums of from \$15,000 to \$300,000, disposed during his lifetime of the remainder of his property, amounting to \$1,500,000, for the same objects, having especial regard to the small colleges of the West, retaining only for himself and his wife an annuity of \$30,000; and J. O. Armour, together with his mother, gave to the Armour Institute (school of engineering) \$1,250,000, after his father had founded the same with \$4,000,000. According to the *American Monthly Review of Reviews*, August, 1901, p. 152, the endowments for American colleges and universities in June of this year were greater than ever before. Among others, Brown University, in Providence, obtained \$2,000,000, and Harvard University, in Cambridge, \$1,000,000 for its medical faculty. "The best of all uses of public benefactions is not for charity to the poor or even to the sick and defective, * * * not for lower education or religion, * * * but rather for affording the very best opportunities for the highest possible training of the very best minds in universities, because in training these the whole work of church, state, school, and charity * * * is raised to a higher level, and in his service all other causes are at the same time best advanced." (*The Nation*, LXX, 1900, p. 229.) This, too, has always been the German principle, and to that end the governments of single states and the representatives of the people have cherished the universities with the greatest care, so that in Germany the most and best universities are found. In America this is sought to be attained partly through state and partly through private universities, and there can be no doubt but that it will also be attained there.

^aThese are the so-called scholarships and fellowships, the first for junior students, the last for those who have attained the doctorate. They vary from \$125 to \$440. In consideration of this the recipients have to perform a service at the University of from one and one-half to two hours daily.

In 1899-1900 the university had 3,183 students, of which 1,449 were women, and in 1900-1901, 3,612 students with 240 teachers and 25 administrative employees (11 women, 4 with title of professor), who receive salaries varying from \$400 to \$7,000. Among the instructors were 12 Germans, and 53 had studied in Germany. In 1900-1901 there were 1,200 lectures, mostly arranged in courses of three months' duration, corresponding to what, as we shall see, is known in Chicago University as the quarter system.

FEMALE STUDENTS.

The number of female students in Chicago University has increased from year to year. In 1892-93 it was 24 per cent; 1893-94, 33 per cent; 1894-95, 35 per cent; 1895-96, 36 per cent; 1896-97, 37 per cent; 1897-98, 38 per cent; 1898-99, 43 per cent; 1899-1900, 45.5 per cent, in a total of 3,183 students, there being 1,449 females and 1,734 males.^a The dean of the women says, in the introduction to a highly interesting annual report,^b that in the University of Chicago these relations are much more simple than in most other institutions for common instruction. From the beginning each and every one of the women has stood on the same terms as the men; never in the world was the work of women as scholars less hampered, and nowhere is it easier for women to obtain a university training. The woman student on entering the university is subject to the same rules as the man student, proceeds in exactly the same manner in respect to choice of studies and business relations and shortly finds herself in class room, laboratory, and library, working side by side with men, and with no question as to her right or privilege.

QUARTER SYSTEM WITHOUT VACATIONS.

Another essential characteristic feature of the University of Chicago is its quarter system almost without vacations, which has introduced an entirely new principle into university instruction, which thus continues on unbroken. The quarter is the unit of reckoning, as is the semester in Germany. The academic year begins on July 1 and is divided into four quarters, which begin respectively on the 1st of July, October, January, and April, and last twelve weeks, there being

^a In the winter semester of 1900-1901 there were at the 21 German universities among 34,363 students and some 2,000 auditors (summer semester, 1901, 35,552 matriculate students), 1,029 women, 12 of whom were matriculate and probably about one-third of whom were foreigners (it was only at Jena that no female students were allowed, but they are now admitted—1903). In the United States in 1898-99 there were 109,659 males and 37,505 females who enjoyed the higher education, of which 18,948 women were at universities and colleges for both sexes, 4,593 at higher women's colleges, and 10,866 at such of lower grade, 1,339 at technical schools, 1,759 at professional schools. (Report of Commissioner of Education, 1898-99, II, 1900, p. 1582.)

^b President's report for 1897-98 (1900), pp. 110-135.

a recess of one week at the end. Each quarter has two equal terms of six weeks. The courses are classified as majors and minors. A minor calls for four to five hours of class-room work (or its equivalent) each week for six weeks; a major requires the same for twelve weeks. Eight to ten hours work a week is called a double minor or double major. The prescribed amount of work for each student is three minors, or one major and one minor in each half quarter. One major and two minors will also be allowed if it is evident that a student is properly using his time. Naturally the courses in a particular science usually last over several terms, six weeks is only the unit, but they must be so adjusted that anyone, without disadvantage to himself or the subject, can begin at the beginning of a quarter.

Each instructor teaches thirty-six weeks during the year, ten hours or its equivalent a week. He enjoys a quarter's vacation, and is free to choose it whenever it can be arranged, or he may take two vacations of six weeks each at different times of the year. If he voluntarily teaches according to agreement more than the normal amount he can obtain for it either a pro rata in salary (two-thirds the usual amount) or an extra vacation (full pro rata). Here, also, the custom prevails of allowing a so-called sabbatical year to the professors (see p. 367) but under more favorable conditions than are allowed in the other universities. Whoever lectures throughout three years of forty-eight weeks or six years of forty-two weeks receives a year's leave of absence with full pay.

RELIGIOUS FOUNDATION.

A third characteristic of the University of Chicago which deserves to be mentioned, at least in a comparison that most nearly concerns me—namely, that with the German universities—is the religious foundation which underlies the entire institution. As we have already seen, the university owes its origin to the religious feeling of J. D. Rockefeller, who regarded it as a duty owed to the Baptist Church, of which he was a member, that something should be done for the elevation and instruction of the people, and although he did not in the beginning have something grand in view, yet through the influence of prominent men he was soon brought to consider it.

Although the articles of incorporation require that the president of the university and 14 of the 21 trustees shall be Baptists, yet it was stipulated from the beginning that the university should bear a purely literary and scientific character, and that no position of any kind should be dependent upon a religious test. This has been strictly adhered to, and, besides, in 1899 the university congregation, which is a governing body composed of over 200 members, meeting quarterly or oftener, made the following public announcements:

1. That the principle of the complete freedom of teaching for all

and every one has prevailed in the Chicago University since its beginning as a fundamental proposition, as is shown by the conduct of the president and of the trustees and in the actual practice of the president and the professors.

2. That this principle shall never, neither now nor in the future, be put in question.

3. That it is desirable, in order to be always clear upon this subject, that the university, as such, should not take part in public affairs and that public expressions by the professors relative to public matters shall be regarded as personal.

ORGANIZATION OF THE UNIVERSITY.

It remains to sketch the organization of the university. This is not yet fully completed, for it has, as yet, only a theological faculty (divinity school), with an annex of an English theological seminary, a Scandinavian theological seminary, a philosophical faculty (graduate school of arts and literature), and a faculty of natural sciences (Ogden Graduate School of Science). There will later be organized, as soon as means allow, a law faculty, a medical faculty,^a a faculty of engineering, a technological faculty, a pedagogical faculty^b—one for the fine arts and one for music.

The university includes five divisions: (1) The schools, colleges, and academies; (2) the university extension; (3) the university libraries, laboratories, and museums; (4) the university press; (5) the university affiliations.

The first division includes the faculties which have just been mentioned (schools), the colleges for art, literature, natural science, commerce, and administration and university college. Each of these colleges is again divided, as is usual, into a junior and a senior college. Finally, there is the academy in Morgan Park, a secondary school.

The second division, the university extension, directs the work of students who can not attend the daily exercises of the university.^c It conducts lectures at places more or less distant from the university (lecture study department), study by correspondence (even in foreign countries), examinations for outsiders, and the library; that is to say, the utilization of the library for students not at the university itself.

^a Recently the whole of Rush Medical College of Chicago has been transferred to the university, and part of the medical lectures will be held there. This, then, now constitutes the medical faculty. 1903.

^b This faculty is now constituted by the recent transfer to the university of the Chicago Pedagogical Institute. 1903.

^c The English call this extension of university instruction the People's University, for its benefits are open to all. It rightly is regarded as absurd if anyone considers that he has ended his education at any definite time, for it can only be ended by death. Alexander von Humboldt was not ashamed to attend lectures even when an old man. I must refrain from giving here a special description of the Chicago University Extension.

The third division includes the general library and all the departmental libraries, the general and special museums, the laboratories, apparatus, and all other material used for instruction.

The fourth division includes the publications of the university, the printing office, the purchase and selling of books, apparatus, and other means of instruction, as well as the literary exchange.

The fifth section includes the relations with institutions which, without belonging organically to the university, have affiliated themselves more or less with it.

The officers are the president, the chaplain, the recorder, the registrar, the deans, the directors, the professors, and the teachers. They are arranged, for the administration of the university, into the university congregation, the senate, the council, seven faculties,^a and six university boards,^b each of these bodies with a prescribed function which I will not particularize here. Over all are the 21 trustees, who choose from among themselves a president, a vice-president, a treasurer, a comptroller, and a secretary.

The following sciences were, in 1899-1900, taught in the University of Chicago, each constituting a department: Philosophy, pedagogy, political economy, political science, history, archeology, sociology, anthropology, comparative religion, Semitic languages and literature, biblical and Patristic Greek, Sanskrit and Indo-European comparative philology, the Greek language and literature, the Latin language and literature, the Romance languages and literatures, the Germanic languages and literatures, the English language and literature, including rhetoric, literature, mathematics, astronomy, physics, chemistry, geology, zoology, anatomy, physiology, neurology, paleontology, botany, rhetoric, Old Testament literature and interpretation, New Testament literature and interpretation, biblical theology, systematic theology, church history, homiletics, church polity, and pastoral duties. At the same time there are 25 seminaries and scientific institutes.^c

^a These are not taken in the sense of the faculties at the German universities. The seven faculties of the University of Chicago are: (1) the faculty of the Morgan Art Academy (elsewhere, instead, the faculty of the teachers' seminary is mentioned); (2) the faculty of university extension; (3) that of junior colleges; (4) that of senior colleges; (5) that of the graduate school of arts and literature; (6) that of the Ogden (graduate) School of Science; (7) that of the divinity school. Only the three last correspond to faculties in the German sense.

^b Administrative board of the university press; administrative board of the university libraries, laboratories, and museums; administrative board of the university affiliation; administrative board of physical culture and athletics; administrative board of student organizations, publications, and exhibitions; administrative board or the recommendation of teachers.

^c In Leipsic there are 54, of which, however, 16 are in the medical faculty which is just about to be established in Chicago.

ELEMENTARY AND SECONDARY SCHOOLS.

As characteristic of the University of Chicago, there deserves to be mentioned the secondary school connected therewith (university academy in Morgan Park.) It was opened in 1892 in the former theological seminary that was merged with the university, and, like all the secondary schools of the United States, was for both sexes. Recently, however, girls have been excluded because the pupils all live in the house itself and not, as in many other secondary schools, in their families.^a The school is about $7\frac{1}{2}$ miles distant from the university, and consists of a row of buildings, a library with 5,000 volumes, dormitories for 170 pupils, etc. The academy is attended for from four to five years, preparation for college being thus attained. The instruction includes Latin, Greek, French, German, mathematics, history, physics, chemistry, botany, and geography. This secondary school belongs to the pedagogical department, as does also an elementary school situated near the university, which accommodates 100 children of an age from 4 to 14 years, and costs \$13,000 annually. These are considered as necessary for the pedagogical department, and are, so to speak, laboratories in which problems of elementary and secondary education are to be worked out. "No work can commend itself more heartily to the attention of the investigator than the study of the growth and development of the mind of the child, and the adaptation of educational theories to such growth." A similar establishment on a larger scale has recently been organized at the Columbia University in New York,^b and at the Chicago University there has recently been laid the cornerstone of a school of education for which \$1,000,000 are available, and which will contain an elementary school for kindergarten instruction and for instruction in beginnings, a secondary school (academy) provided with a manual training school, and a normal school.

UNIVERSITY EXTENSION.

The university extension concerns itself chiefly with lectures in Chicago and in neighborhoods more or less remote, on philosophy, pedagogics, political economy, history, sociology, anthropology, Semitic languages and literatures, Greek language and literature, Romance languages and literatures, English language and literature, astronomy, geology, zoology, neurology, botany, music, art, Old and New Testament literature and interpretation, and in this the director of the art institute and employees of the Field Columbian Museum take part; these also are docents in the university. In 1898-99 there were 125 such courses held. Besides this, the university extension gives

^a There are many secondary schools in the United States in which pupils of both sexes live in the school itself. These are the so-called boarding schools.

^b See *Columbia University Quarterly*, III, pp. 243-246, 1901, The New Horace Mann School, by S. T. Dutton.

instruction by means of correspondence in the above-named sciences, as well as in theological seminary work, for such as have not attended any college. In 1898-99 1,049 persons availed themselves of such correspondence courses. It has been shown that many of the best students of the university have been brought to the university by means of correspondence study, and that many of the best students have been carried along in this way while necessarily absent from the university.

UNIVERSITY AFFILIATIONS.

The university permits certain institutions to affiliate themselves with it in order, through their influence, to favorably affect primary and secondary schools, as well as colleges, with a view to raising them to a higher level. This affiliation occurs in four forms—organic membership in the university, semiorganic union with the university, alliance between the university and completely independent institutions, and tentative affiliation.

UNIVERSITY PRESS.

The publishing division of the university deserves special mention, especially as it is destined to great development. Quite recently the corner stone of a new building for its use has been laid.^a The University Press consists of four departments: Publications (offices now established in the botanical laboratory building); printing (now established in the gymnasium); purchase of books and apparatus for the entire university, entirely done through this office, and bookstore and stationery for students and teachers (now established in Cobb lecture hall). The following are regularly published: The Annual Register, a comprehensive annual publication in quarto, which gives much information concerning the university; The President's Report, an annual publication in quarto; The University Record, a weekly paper; Circular of Information of the Graduate Schools and Colleges in the Departments of Arts, Literature, and Science; Circular of Information of the Divinity School; University Handbook; Circulars of Information of the University Extension Division; Calendar of the Morgan Park Academy; Departmental Programmes. The following periodicals: Journal of Political Economy (quarterly); American Journal of Sociology (bimonthly); American Journal of Semitic Languages and Literatures (quarterly); Biblical World (monthly); Astrophysical Journal (10 numbers per year); Journal of Geology (bimonthly); School Review (10 numbers per year); Elementary School Record (monthly); Botanical Gazette (monthly); American Journal of Theology (quarterly). Besides there are the following, which appear from time to time: Contributions to Philosophy (I-IV); Economic Studies (I-IV); Studies in Political Science (I-III); Studies in Class-

^aNow ready, 1903.

ical Philology (I-V); Germanic Studies (I-III); English Studies (I); Physiological Archives (I); Anthropological Bulletins (I-III).^a In 1898-99 there were expended for these about \$41,000, about \$6,500 of which was for salaries. In the printing office there were 20 to 40 typesetters employed, but the forms were sometimes printed outside. Besides the above-named official publications, the printing office also issued in 1898-99: Proceedings of the National Educational Association; Fifth Herbart Year-Book; Smith: Chemistry Outlines; Report of the New England Association of Colleges and Preparatory Schools; Report of the North Central Association of Colleges and Secondary Schools; Proceedings of the Southern State Association; S. W. Burnham: Catalogue of Double Stars, I (publication of the Yerkes Observatory); J. Dewey: School and Society (already in its 3d edition); Manual Training Magazine. In the book and stationery store there were sold in 1898-99 articles to the value of about \$39,000. It is an unusually convenient arrangement for the professors and students that they can enjoy, within the university itself, a well-assorted bookstore, where they also receive a considerable discount.

CONCLUSION.

As I stood one beautiful clear evening in Indian summer upon the tower of the lofty Masonic Temple of Chicago, fanned by soft breezes, my glance swept far to the eastward over the unlimited expanse of smiling Lake Michigan, overarched by the blue heavens; on the west, however, the dark red sun laboriously struggled through the unsightly vapor that poured from the smoking, steaming Babel, from the million-mouthed monster of a city, a hell—yet looking out upon a seductive paradise!

"Chicago is the young giant among the cities of the earth, and is only at the threshold of its destiny," says a recent English observer. "We hope that during the coming years there will be removed from the way many of the stumbling blocks that we all very well know still exist to-day in this new and unequally developed city; but Chicago sixty years ago was only a prairie, with a few thousand men on it," so wrote to me recently one of my friends from there.

In the description of the institutions which has filled the previous pages I could do justice to only a portion of the intellectual life of this city, perhaps the most interesting one of the whole earth, especially because of its great contrasts; for to me the view from the lofty building appeared symbolical, and most interesting for a further reason—because so much is still to be expected from its development more than from any other city—that it promises to become one of the future

^a There are also published by the students: *The University Weekly* and the *Cap and Gown* (a yearly publication).

"wonders of the world." The germs for this can be seen shooting up everywhere.

Many things I have been unable to include within the scope of my studies. Among these are the technical schools (Armour Institute and Mechanics' Institute), the medical schools, the hospitals, the city hall and county court-house, and others. The last named, double building, cost \$5,000,000, and certainly offers much that is instructive in many ways as regards museum interests, as do, for example, the corresponding buildings in Boston, which I hope to be able to describe. Recently Mr. J. E. DuBois, from Dubois, in Pennsylvania, gave \$1,000,000 for a Chicago medical school of homœopathic practices, with a hospital, which led me to lament that this large sum was not applied to efforts more scientific in character than those of homœopathy. I mention this in order to show how all possible interests find there a ready advocate. Perhaps there had deserved to be included in my report a description of a building like the "Monadnock" (named for a mountain in New Hampshire about 3,200 feet high), which is only 400 feet long and 70 feet wide, but is seventeen stories high and contains 1,200 business offices, with 6,000 persons constantly employed therein.^a It constitutes, by itself, a postal district with 14 employees, who daily handle 45,000 pieces of mail and sell stamps amounting to \$2,000.

Although not in this connection, I might, however, in order to illustrate the specially developed talent of the Chicagoans for organization, as is shown in the incredibly rapid establishment of their museums, libraries, and universities, mention one interesting installation among many others, namely, that of the city railway.

Chicago, the city of so many technical surprises, possesses a very remarkable arrangement of its city railways. From a center where almost the entire business life is crowded together in 20-story houses within a space of a few square miles, there radiate toward the south, the north, the southwest and the west, four great electric lines, elevated on iron viaducts, each 10 to 15 miles long. On the eastern side the business portion of Chicago is limited, as is well known, by Lake Michigan. The uniting member and turning place for all the elevated lines, giving at the same time an opportunity of transfer from one line to another, and yet constituting a line by itself, is the so-called Union Loop in the center of Chicago, perhaps the most remarkable and most frequented piece of railway in the world. The loop is a double-track viaduct about 2 miles long, that surrounds a rectangular area of a portion of the chessboard-like blocks of the business center. The area is five blocks wide and seven blocks long, and its seven stations are so arranged that from any point in the business center it will take not more than three minutes to reach the nearest one. In this way it is possible to reach a railway going in any direction, for the trains of all four of the elevated roads, as soon as they get to the business part of the city, must pass over the loop and stop at its eleven stations before they can again come to their own line and pass out toward the suburbs. The travel on this loop is enor-

^a Life in such a colossus is depicted by H. B. Fuller in his readable romance, *The Cliff Dwellers*, which at the time created so unpleasant a sensation in Chicago, because in it the author unsparingly exposed some of the dark sides of social life among the swarming millions of the city.

mous. On an average day there are 1,000 trains or 4,000 cars used, and during the busy hours of the day there are always 30 trains at a time upon this short line, indeed on special occasions, caused by excessive crowding, the tracks of the loop are literally covered with trains; they often run at intervals of less than one minute apart. Although the loop is provided with a double track yet all the trains go in the same direction; the lines that join the loop at three of its four corners are distributed upon the two tracks, according to their frequency. In the first 14 months after it was established this remarkable railway was used by 80,000,000 of passengers. The great business houses situated near the stations have already begun to build stairways from their second stories connecting directly with the gallery of the station in order to spare their visitors the trouble of descending into the street. At each station there is also a special stairway for the trains of each line and a reserved space is railed off along the track, so that the loop may really be said to have 44 stations. The whole loop might properly be considered as a single gigantic terminal station for all four elevated roads, and as the grandest effort hitherto made to unite several railway lines in a single center. (Newspaper notice).

In conclusion I will name a few of the scientific, literary, and art associations of Chicago, as far as I heard of them, as these characterize the intellectual life of the city: Chicago Astronomical Society, Humboldt Club, Illinois Audubon Society, Audubon Club, Entomological Society, Mycological Society, Polytechnical Society of Chicago, Western Society of Engineers, Literary Club, Ravenswood Historical Society, Chicago Society of Egyptian Research, Altura Library Association, Chicago Library Club, Bibliographical Society, Book Club, Central Art Association of America, Chicago Art Association, Art Students' League of Chicago, Society of Western Artists, Illinois Chapter of the American Institute of Architects, Chicago Architectural Club, Chicago Ceramic Association, Altura Ceramic Art Club. These, however, by no means exhaust the list of such societies.

B.—NOTES ON SOME EUROPEAN MUSEUMS AND KINDRED INSTITUTIONS. ^a

INTRODUCTION.

After visiting, during the autumn of 1899, some of the museums and libraries of the eastern section of the United States, concerning which I made a partial report, it seemed to me desirable to revisit some of the principal museums of Europe, and to examine others for the first time, in order to have a just measure for estimation of the American establishments, which profoundly impressed me. The general direction of the Royal Collections of Art and Science in Dresden also commissioned me to do this in view of the proposed, though

^aTranslation of *Über einige Europäische Museen und verwandte Institute-Reiseerfahrungen* von Dr. A. B. Meyer. Verlag von R. Friedländer & Sohn in Berlin, 1902. *Abhandlungen und Berichte of the Royal Zoological and Anthropologico-Ethnographical Museum at Dresden*, X, 1902-3, No. 1.

recently deferred, erection of a new museum building in Dresden, and I now report on the result of my observations.

I could not, in the case of cities like London and Paris, undertake to make as detailed a report as I attempted for New York and Chicago, and as I hope to do for Washington, Philadelphia, and Boston (including Cambridge), for that would require much more time than I had at my disposal. There is, indeed, no necessity for this, for the museums and allied institutions of London and Paris are known to every one who has to do with museum administration. I could only endeavor to discuss what is new and worthy of imitation there, and what would be valuable for solving our problem in Dresden.

Although probably no one will take exceptions to my noting the good features that I find, yet in case of blame some one is certain to say that "those who live in glass houses should not throw stones." Of course I am aware of the inadequacy of my own efforts, and I know that in many instances the deficiencies are to a greater extent the fault of the circumstances than of the persons, for one individual has little control of the many combinations on which the historical development of museums and similar institutions depend. It is rare, at least in Europe, though possible in America, that anyone has an opportunity to commence at the beginning and build up an establishment from the foundation. My censure, therefore, can not and will not be personal, but will deal rather with the conditions that are beyond the control of the individual. If I am blamed for recounting my experiences principally in the form of personal impressions, the reader may be assured that I do so only for the purpose of allowing others to share them, for which purpose I can not avoid the subjective method of statement.

The arrangement indicates the course of my travels during September and October, 1901.

Photographs were in most cases difficult to obtain, and my illustrations are consequently not uniformly distributed, and in some cases unsatisfactory. To the gentlemen who were so good as to place originals at my disposal, and who were in other ways of much assistance to me, I here make acknowledgment of my sincere obligations.

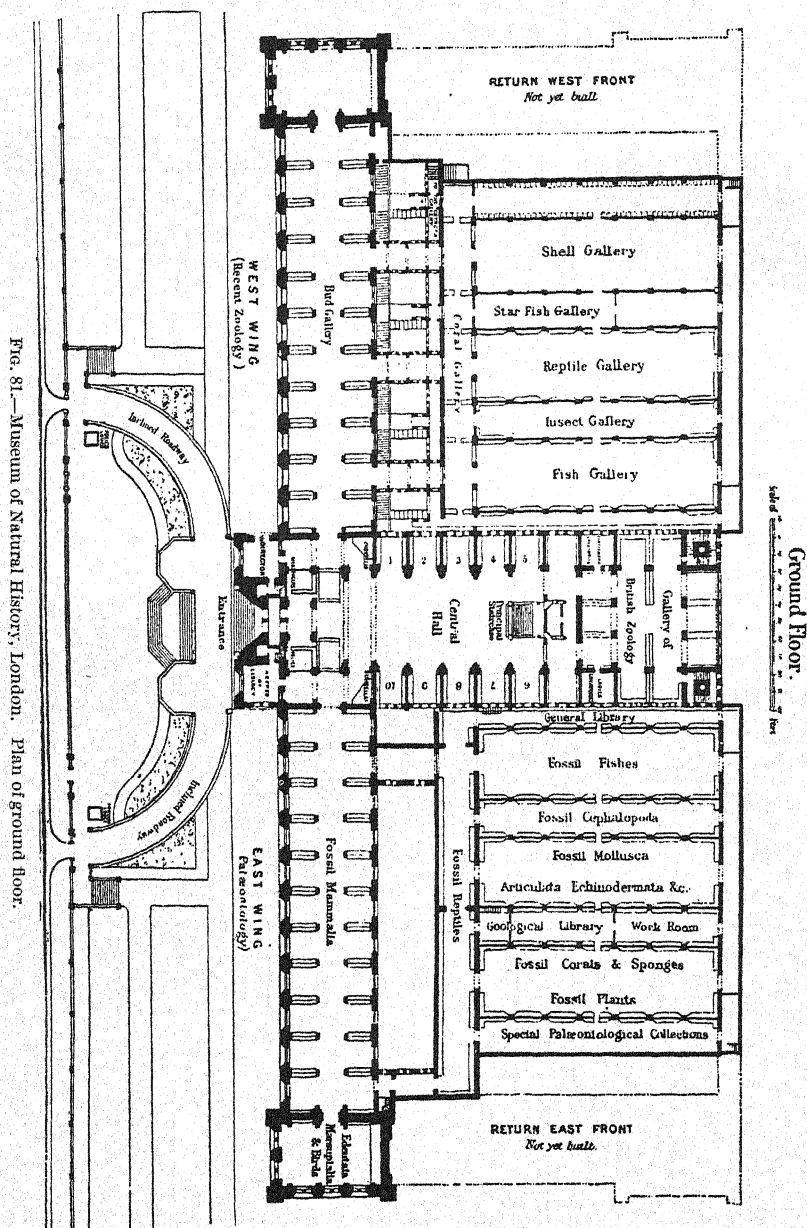
V.—LONDON.

17. MUSEUM OF NATURAL HISTORY.

DEPARTMENT OF BRITISH MUSEUM, CROMWELL ROAD, S. W.

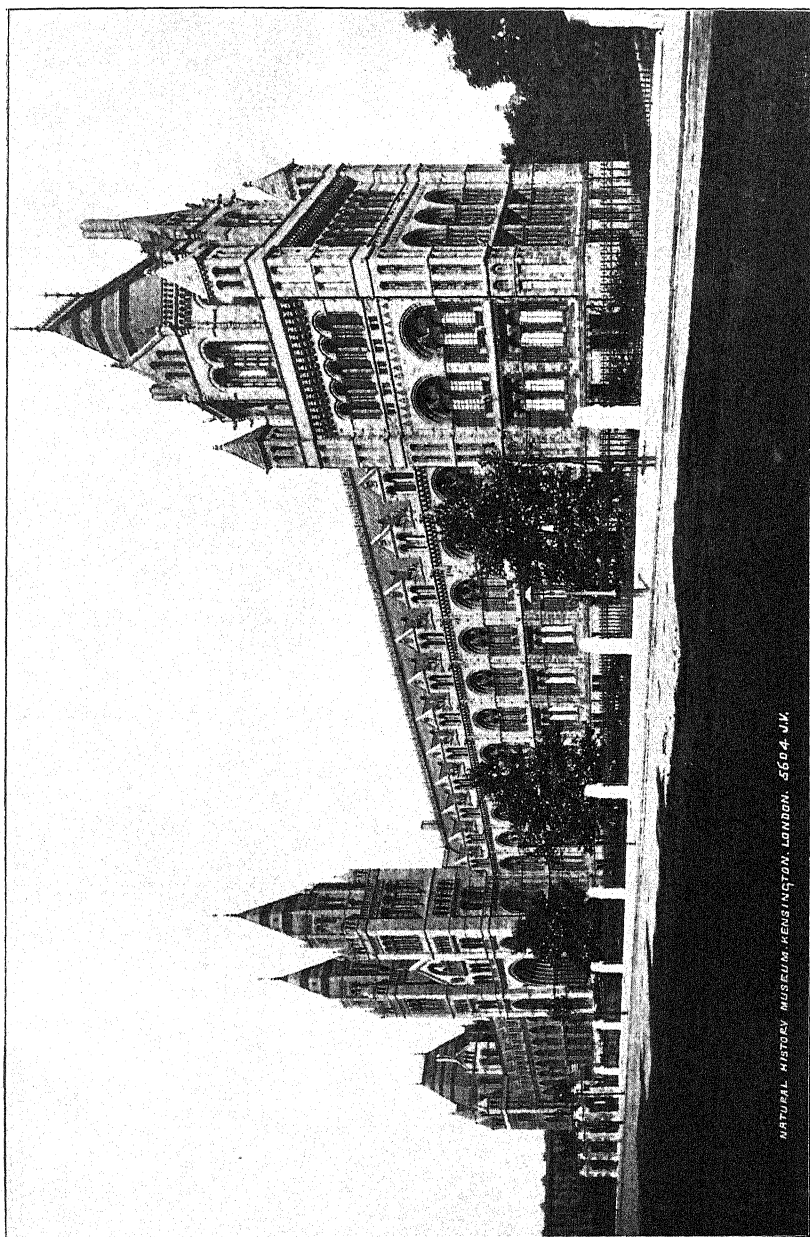
In its contents the Natural History Museum in London unquestionably occupies the first place among all such museums of the world. The portion to which the public is admitted is unusually extensive and is open daily from morning until evening. The visitors are not counted by turnstiles and the numbers published annually are consequently not

exact. The total for 1900 was 485,288.^a One is not compelled to check canes, etc., though this can be done without charge. There are



very few seats for visitors. There is a restaurant in which one can dine at a reasonable price.

^aIn 1901, 417,691; in 1902, 433,619.



NATURAL HISTORY MUSEUM, KENSINGTON, LONDON. 5694 J.K.

MUSEUM OF NATURAL HISTORY (PART OF BRITISH MUSEUM), KENSINGTON, LONDON.

The architect was A. Waterhouse." Plate 33 shows the exterior of the building, figs. 81 and 82 the ground plans. The interior is impractical and disagreeable. Even the officials have positively expressed them-

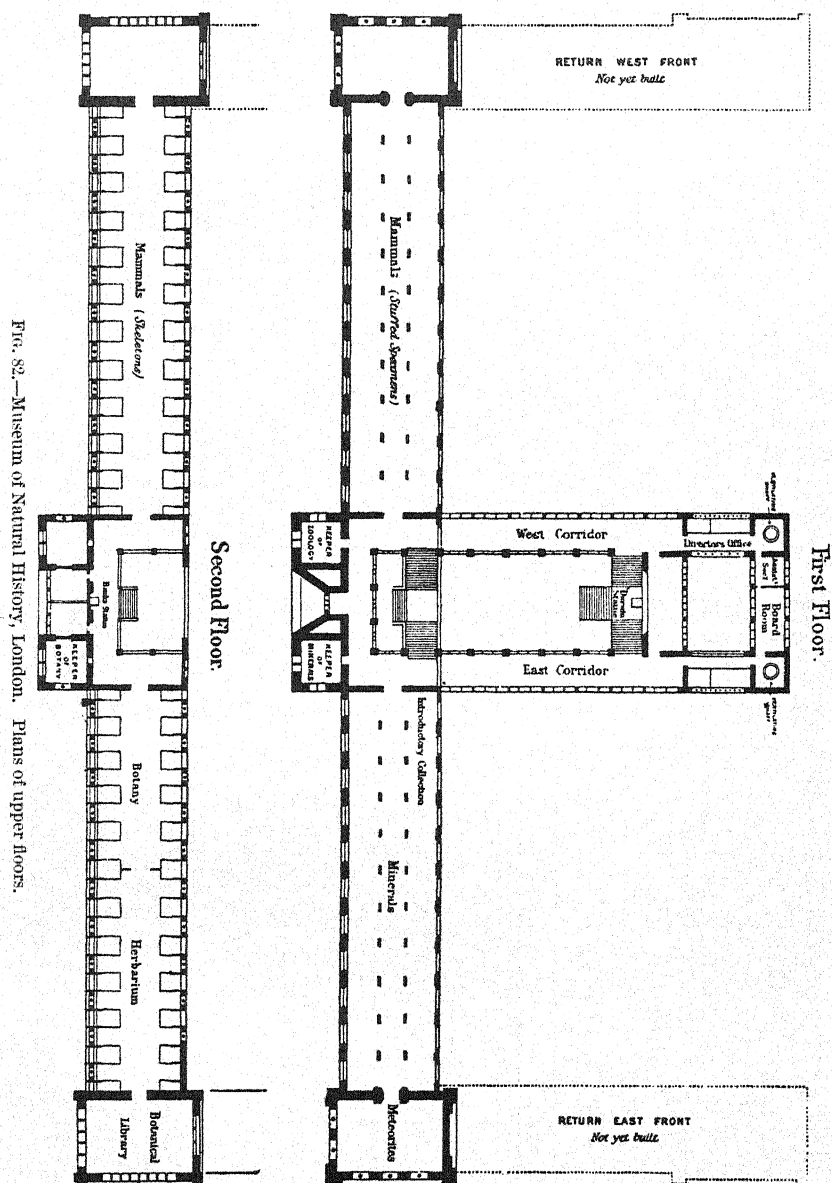


FIG. 82.—Museum of Natural History, London. Plans of upper floors.

selves concerning both of these defects, and are certainly the best judges

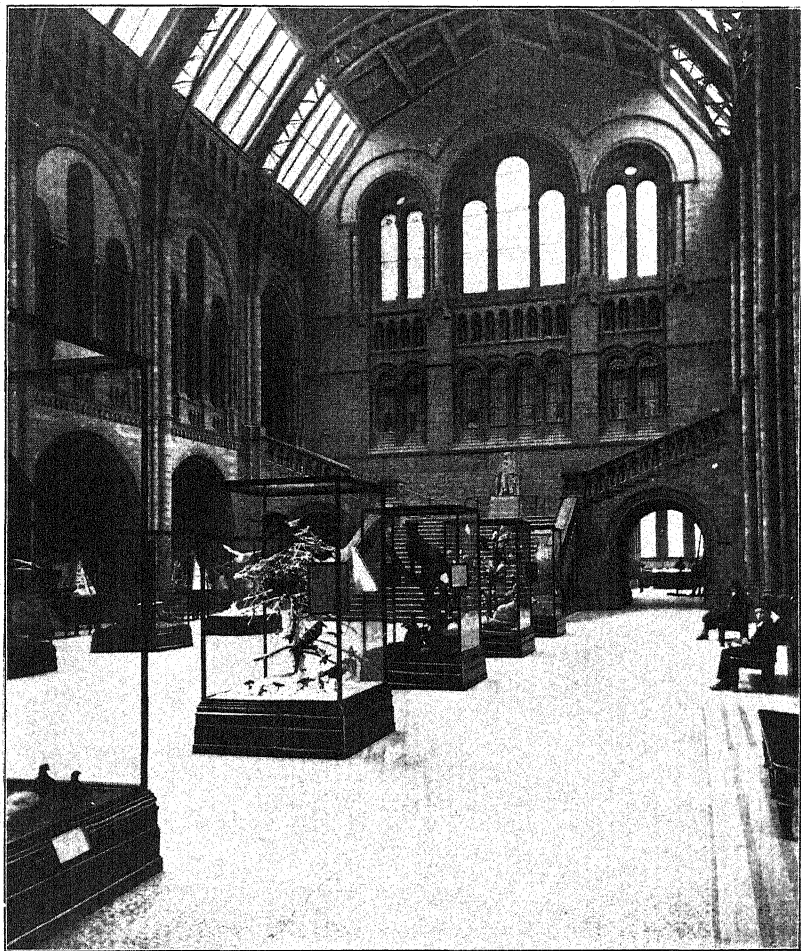
"The construction extended from 1873 to 1880. In 1886 the installation of the collections, which were formerly in the British Museum (Great Russell street), was completed. The building is 675 feet long and has two towers 190 feet high, while

of the first one. The very high entrance hall (Plate 34) appears to me to be too churchlike and empty. That it looks very dingy is, of course, due first of all to the London atmosphere, but perhaps also it is due to the character of the building materials and the yellow color, being of terra cotta, ornamented with animal representations in high relief.^a The side galleries with skylights (fig. 83) give somewhat the impression of factory rooms. The installation is in some respects excellent, but in many cases is capable of improvement, notwithstanding the fact that enormous sums have been expended on it. Some groups of birds, for example, cost as much as \$250 or more. Rather too much has been done in this respect to the greater neglect of other things. The cases are of mahogany, clumsy and unprepossessing; some of the backgrounds are green. The labels have been prepared with much care and taste. The arrangements for lighting are in part deficient. An anthropological gallery has recently been installed, which promises in time to be very attractive, but otherwise there has been but little general change in the twelve years since I last visited the museum. The number of visitors on the three occasions when I was at the museum was not great, and one can scarcely feel that there is justification for exposing these valuable collections to the light from morning till evening, when it is evident that they will be ruined thereby. If the shades are drawn, however, it becomes so dark that one can see but little. Everywhere in England the collections are exhibited during the entire day, and it is said that this custom must continue, for otherwise the money for expenses will not be forthcoming. I think, however, that this is an error. If the officials themselves were only convinced that the collections intrusted to their keeping are really being injured they would be able to impress this fact upon the trustees, but they fail to consider the subject, or at any rate have neglected it until very recently. The public would soon become accustomed to shorter hours of opening if there were some way of making them generally known. This is not the case now, everyone knowing that he can gain admittance from morning until evening.

There are no double windows, these always being omitted in English museums. There is no necessity for them, however, for no annoy-

the large entrance hall is 170 feet long, 95 feet wide, and 72 feet high. Regarding the style the architect says (General Guide to the British Museum, Natural History, 1888, p. 12) that it is "earlier Romanesque, which prevailed largely in Lombardy and the Rhineland from the tenth century to the end of the twelfth century."

^aThe architect says (Guide to the Museum, p. 14): The Museum is the largest, if not indeed the only modern building in which terra cotta has been exclusively used for external facades and interior wall surfaces, including all the varied decoration which this involves. On the western side of the building, where it is intended that the zoological collection shall be placed, the ornamentation of the terra cotta (which will be found very varied both within and without the building) has been based exclusively on living organisms. On the east side, where geology and paleontology find a home, the terra-cotta ornamentation has been derived from extinct specimens.



MUSEUM OF NATURAL HISTORY, KENSINGTON, LONDON. ENTRANCE HALL.

ance is caused by frost and melting ice. In most respects the climate is milder than with us, though single windows are found also in many other European museums as well as in the large museums of the United States, where the winters are very cold. In the newly-constructed Natural History Museum in Brussels, however (see p. 597), I

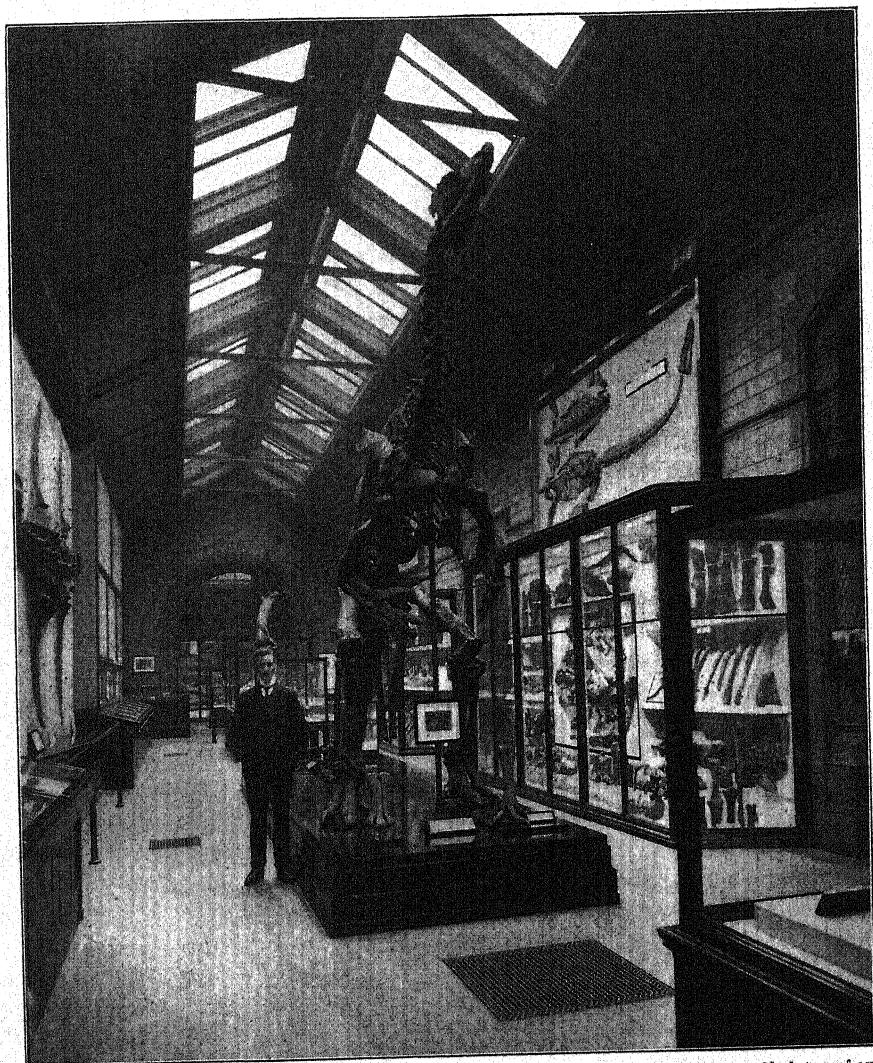


FIG. 83.—Museum of Natural History, London. Side gallery containing fossil reptiles. Skeleton of an Iguanodon in the foreground.

found double windows with a very considerable space between the two lights. The Director was of the opinion that the great hall (84 by 30 meters) could not be heated without the double windows. I do not share this opinion, for in the present day any room can be well heated,

and moreover, double windows are just as likely to become frosted. These are not, therefore, necessary in a new building, unless we prefer them because the movement of air and consequently of dust can be diminished by their use, and because the dust from the street is less likely to enter, except when, as we shall see below, the windows are closely secured and dust-free air is brought in through other openings.

The museum can not be said to be entirely fireproof. Much superfluous wood is used, and the location of the heating apparatus is unfavorable.

The museum has four departments—zoology, geology, mineralogy, and botany. Its annual expenditure is about \$250,000. Each department has a keeper who receives from \$3,500 to \$4,000, and there are assistant keepers with salaries of \$2,600 to \$3,200; assistants of the first class, with salaries ranging from \$1,500 to \$2,500, and of the second class, from \$750 to \$1,500.

Special mention should be made of the publication by the museum, at its own cost, of systematic descriptive catalogues aggregating considerably more than 200 volumes, with thousands of illustrations. In this undertaking the British Museum is preeminent and by it has put deeply in its debt every student of natural science. It excels all other museums of the earth so markedly in this respect that they sink into insignificance by comparison. It would be useless even to attempt to compete with England in this regard. These catalogues are not only catalogues of the collections of the museum, but monographs in which all known species are described, whether they are represented in the museum or not. There is, however, little that is lacking in the collections of the British Museum, for, as has already been said, no collections in the world can be compared with them in completeness. It is not my purpose here to describe in detail this famous collection. The most notable exhibits are, perhaps, those in the mineralogical and paleontological departments, and in the so-called "Index Museum" of the main hall, which serves as an introduction to zoology and is an original creation of the former director, Sir William Flower. Many museums have endeavored to imitate this feature to some extent. The catalogues mentioned are distributed liberally.

18. BRITISH MUSEUM.

[Great Russell street, Bloomsbury.]

In the British Museum on this occasion I confined my attention chiefly to the ethnographic collection. It contains many valuable old specimens, but has not kept pace with its sister collections. While Berlin has since the seventies built up an ethnographical collection which is scarcely to be surpassed, and good collections have been brought together in many cities of Europe and America, London has

made little progress in the latter half of the last century. The former director, Sir Augustus Franks, a man of European reputation, and during the time of his administration (1860 to 1880), the best authority on ethnographical matters—one might say the teacher of the older generation of ethnographers—gave in the latter part of his life less attention to the broader problems of ethnography. However, on account of the world-wide rule of the English Government, it is naturally and must continue to be the task of the British Museum to lead in ethnography, since that museum has greater opportunities than any other. This collection nevertheless has not made much progress, and the contents of the ethnographical department of the British Museum make no better showing than many of the continental museums, not to mention the Berlin collection. In this stepmotherly treatment of ethnography the British Museum does not set a good example to the other museums throughout that country, while the Berlin Museum, for example, has had and continues to have a fruitful influence throughout the whole of Germany. In London the antiquities resulting from the English explorations in the Pacific Ocean (the British Museum was established in 1753) are, however, still unexcelled. The arrangement, classification, and labeling leave something to be desired. The exhibits in halls lighted from above are crowded and not pleasing.

In this respect England has allowed herself to be surpassed, but this fault may be found with all of her ethnographic collections, excepting that at Oxford (see p. 533).

While much has been generally done in the British Museum in the way of explanatory labeling, this can not be said of the ceramic collection, which, however, still excels in that respect some of the continental collections.

The famous library of the British Museum, although it possesses such magnificent features, can not as a building or in many of its installations and contrivances compare with the new American libraries. It requires, for example, from a half to three-quarters of an hour to obtain a book, and, besides, the facilities for reading are not entirely convenient. Books are not allowed to be taken home. The printed catalogues, on the other hand, are unequaled, being—considering the riches of the collections, for the most part bibliographies, while they contain also a large number of cross references—admirable works. G. A. Crüwell^a calls them “a milestone in the history of catalogue making.” In 1875, the manuscript catalogue having increased to 2,000 volumes and being too unhandy and cumbrous for use, its printing was undertaken, and was completed in twenty years, from 1881 to 1900, about 400 quarto parts at a price of \$450. The increase, however, is so extraordinary that the printing has been continued, and

^a *Mittheilungen des Oesterreichischen Vereins für Bibliothekwesen*, V, 1901, p. 32.

there has been published, for example, a three-volume subject catalogue in octavo, embracing the additions from 1880 to 1895, comprising over 120,000 works. The library receives all volumes copyrighted in Great Britain and Ireland and in the British colonies, and expends about \$50,000 yearly each for purchases and for binding. As to the number of volumes erroneous reports are generally circulated. It is claimed that the National Library in Paris is the largest, with 3,000,000 volumes; then follows the British Museum, with over 2,000,000; then the Berlin Royal Library, with 1,000,000. As a matter of fact the British Museum is the richest, with from four to five millions, of which perhaps half a million are periodicals that occupy 12 straight miles and embrace over 30,000 different journals (exclusive of newspapers), in which respect no other library in the world even approximately approaches it. In wealth of books, therefore, the library of the British Museum in London is unequaled, though the number of readers is comparatively small—in 1899, 188,554.^a

The total number of visitors to the British Museum in 1900 was 689,249 persons, of which 43,892 came on Sundays.^b

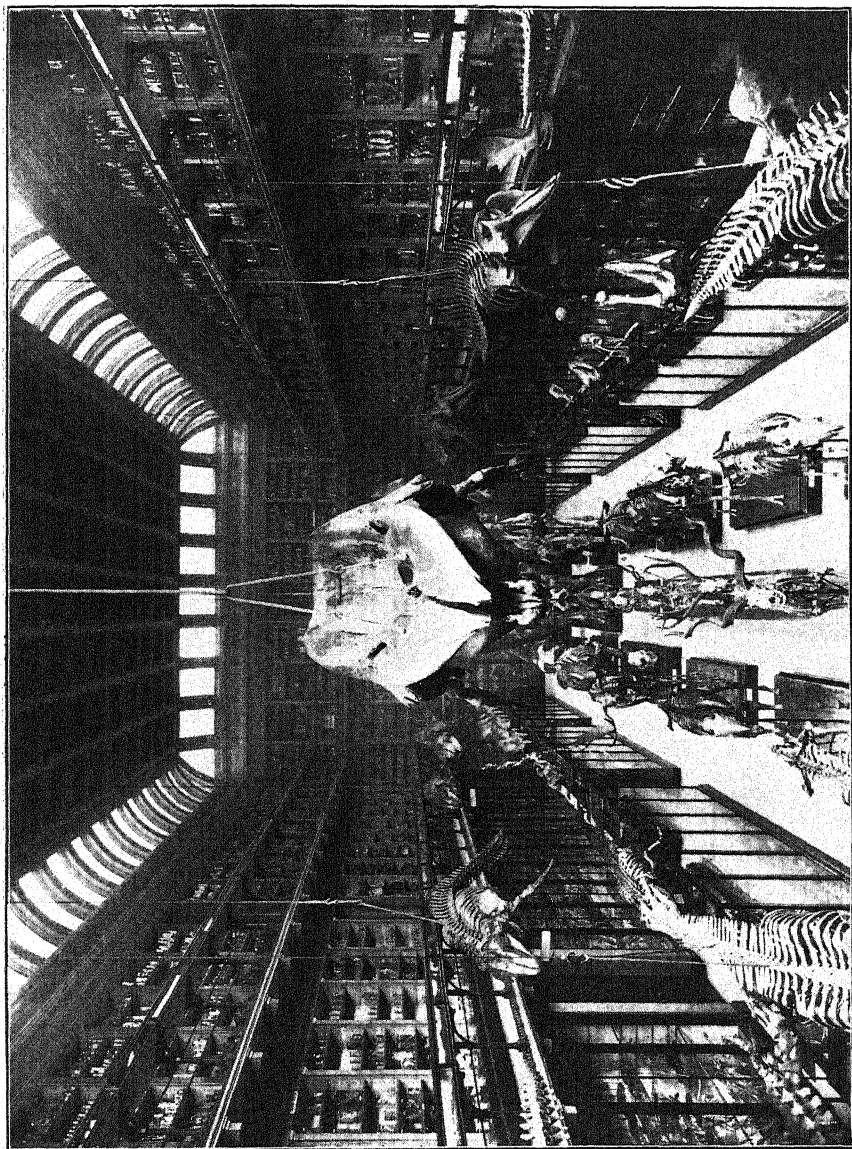
19. OTHER LONDON MUSEUMS.

MUSEUM OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

This famous museum of comparative anatomy, whose directors in recent times have been, in succession, Owen and Flower, can perhaps be regarded as the best natural-science museum in the world, even though it does not entirely correspond to the modern standard. It consists of a series of large halls with skylights and two or three galleries one above the other (Plate 35 represents one of these halls). On account of this arrangement the light is sometimes insufficient; there are corners and spaces underneath the galleries which are completely dark, and the reflection from the glass desk cases in the galleries is very annoying. The general effect, however, is noble and beautiful. Much stress is laid upon the admirable method of installation, though it does not always in every respect represent the highest advances. The anthropological collection is, in particular, not so carefully and scientifically installed as far-reaching demands would necessitate, and the whole museum could be kept much cleaner. There is, however, not a sufficient labor force for this purpose.

Although the disadvantage of high halls and galleries lighted from above was known, in order not to depart from the uniform plan of the interior of the museum a similar large hall has lately been added. The cabinets and cases are, as is almost uniformly the case in England, constructed of mahogany—antiquated and clumsy, and not dust proof.

^a In 1900, 198,566; in 1901, 200,035. ^b In 1901, 718,614, of which on Sundays 48,895.



ROYAL COLLEGE OF SURGEONS, LONDON.
Hall of Comparative Anatomy.

The soot from the air of the city does not penetrate too much into the building, since, with the exception of the skylights, there are no windows in the halls; a double glass roof, moreover, offers considerable protection. The ventilation arrangements are primitive.

The library comprises 50,000 volumes and does not incorporate any books relating to systematic zoology. There is a card catalogue arranged by authors and subjects.

The collections contain upward of 11,000 comparative-anatomy preparations, among them upward of 3,700 fossil and nearly 2,700 pathologico-anatomical. Excellent printed catalogues concerning them are published, among others a Descriptive Catalogue of the Osteological Series contained in the Museum of the Royal College of Surgeons of England (2 vols., London, 1853, quarto, xlv, 914 pp.); a Catalogue of the Specimens illustrating the Osteology and Dentition of Vertebrated Animals, recent and extinct, contained in the Museum of the Royal College of Surgeons of England, I-III (London, 1879-1891, octavo, lxvii, 1036 pp.); a Descriptive Catalogue of the Teratological Series in the Museum of the Royal College of Surgeons of England (London, 1893, octavo, xxiii, 192 pp). The collection is, first of all, scientific, and as such is a true ornament to the nation.

The illustration given is reproduced from the Souvenir of the Centenary of the Royal College of Surgeons of England, 1800-1900 (London, 1900, quarto, 33 pp.).

SOUTH KENSINGTON OR VICTORIA AND ALBERT MUSEUM.

This famous museum of art and industry is unsuitable as a building, the lighting being in some parts very bad and the installation much too crowded and not well adapted for inspection.^a The labeling is very good throughout, though the cards are printed in such small type that in the insufficient light they are often quite illegible. On the other hand, the former India Museum (Indian section), that now belongs to it, is installed in a primitive, unsystematic manner, and insufficiently labeled. Furthermore, the ethnographic section, part of which is very valuable, is not well arranged. The management of the oriental art collections, which, with the Indian one just mentioned, are now located in the adjacent Imperial Institute (which, intended in the first place for collections, is now occupied by the university), is not entirely satisfactory. New halls, however, are now being erected for both these large collections. It is impossible for me to do justice to the tremendous whole of the South Kensington Museum in the space of this report. Besides, it is generally known. Its excessive abundance of objects quite oppresses the receptive faculty of the most alert sight-

^a "The worst possible conception of the mode of arranging museums is exemplified at South Kensington." W. S. Jevons, *Social Reform*, 1883, p. 59.

seer.^a This overabundance constitutes an especial vice of museum science. Only the best should be readily accessible. Here also the collections are damaged by being exposed to daylight (also to electric light) from morning until evening, which is the more regrettable since a large portion of the exhibits are of such a nature as not to endure the light at all. The exposure is, therefore, scarcely justifiable.

The number of visitors to the museum in 1900 was 846,489, of which 87,854 came on Sundays. Umbrellas and the like are not deposited at the door. Visitors are at a disadvantage on account of the small number of trained attendants. The majority of attendants in nearly all English museums are policemen, who are engaged only temporarily. One is therefore unable to obtain information of any value concerning the collections, and on account of the size of the whole exhibition a study of the "guides" and "handbooks" is not to be thought of unless one is pursuing a single question. Even if a person wishes, for example, to obtain information about some certain object, it requires at least an hour or more, on account of the extent of the collection.

The annual expenditure for 1897-98 amounted to \$420,000, of which \$70,000 was devoted to the purchase of specimens, \$190,000 to salaries (\$60,000 to the policemen), \$60,000 for cleaning, and \$26,000 for heating and lighting.^b Some very instructive data relating to the internal affairs of this museum may be found in the second report from the select committee on museums of the science and art department, with the proceedings of the committee, ordered by the House of Commons to be printed July 29, 1898 (folio, 105 pp.).

NATIONAL GALLERY.

The National Gallery, with its famous collection of paintings, lacks intimate charm in the style of its building and in the installation of the pictures. This is emphasized by the great influx of the general public. Umbrellas, etc., are required to be deposited. In 1901 it was visited by 478,346 persons on 204 free days, besides 35,704 on 30 Sunday afternoons, and 42,177 on Tuesdays and Fridays for an admission fee of six pence, making a total of 556,227. (The Dresden Gallery had, in 1901, 266,263 visitors.)

NATIONAL GALLERY OF BRITISH ARTS, OR TATE GALLERY.

The Tate Gallery is a new building, in classic style, designed by S. R. J. Smith and constructed in 1897-1899. I do not regard the building, as such, especially noteworthy or well adapted to its pur-

^a "That the South Kensington Museum should have degenerated into a vast, chaotic *omnium-gatherum*, without intelligible plan, methodic province, or definite order, was only to be expected as the ultimate result of this system alone." T. C. Robinson, *Nineteenth Century*, 1892, p. 1029.

^b For the year 1903, £66,994 has been granted, inclusive of the Bethnal Green Museum, a branch institution.

pose. In 1891 there were 185,344 visitors on 206 free days, besides 42,015 on 30 Sunday afternoons, and 25,821 on Tuesdays and Fridays for an admission fee of six pence; total, 253,270.

WALLACE COLLECTION.

This famous collection of paintings and works of art is installed in a palace (Hertford House), which, though it has been to some extent adapted to its present purpose, yet possesses many disadvantages as a museum. It is one of the greatest attractions of its kind in London. It formerly belonged to the Wallace estate, but was later presented to the nation. Its value is estimated at \$20,000,000.^a

ROYAL BOTANICAL GARDENS.

The Kew Gardens, the foremost scientific establishment of the world in systematic botany, is admirably administered, with an excellent museum of practical botany.

HORNIMAN FREE MUSEUM.^b

"The arrangement of the building is as follows: Connected with some smaller halls, which are first entered, is a larger one about 108 by 60 feet and 42 feet high, with skylight, and encircled above with a gallery 6 feet 6 inches broad. These spaces constitute the front half of the building, and contain a systematically arranged ethnographical collection, chiefly of personal ornaments, which are installed in the gallery in cabinets. In the rear half of the building, on the ground floor, the ethnographical collection is continued. The hall is not provided with any light, and when anyone is admitted it is illuminated by electric lights. Here the objects are arranged more in a geographical order. The second story of the rear building is on a

^aFor the year 1903, £9,066 has been granted for the administration of this museum.

^bExtracts from a report which was placed at my disposal by Dr. O. Richter, assistant in the Dresden Ethnographical Museum, who visited the Horniman Museum in February, 1902. I did not find time to visit this museum, on account of its distance in Forest Hill. From a description by the director, R. Quick, in the *Report of the Museums Association*, 1900, pages 58-63 (compare, also, the Horniman Free Museum, in *The Studio*, XXIV, pp. 196-202, with 5 illustrations, 1901), I note that this museum of art and science was built in 1899 by C. H. Townsend, in free Renaissance style, fireproof, of red bricks, with limestone front, in which is introduced a crystal mosaic picture 36 feet long and 11 feet high, after the design of A. Bell. The building has a bell tower 33 meters high, which contains a water reservoir for supplying the heating apparatus. The museum is, in its entirety, about 280 feet long and 65 feet wide. The collections were formerly installed in the residence of Mr. F. J. Horniman, who had zealously collected them in his travels around the world during forty years, and who allowed his residence to be torn down to make room for the museum. Since 1891 it has been open to visitors on three days in each week. Between 1891 and 1898, when it was demolished to make room for the new building, it was visited by 455,591 persons. Since 1891 the director has issued, annually, a brief report, with illustrations. The library contains 6,000 volumes. There are 7 officials. The entire cost of maintenance is defrayed by Mr. Horniman.

level with the gallery of the front half, and consists of a hall (natural-history collections) with a skylight, about 108 by 60 feet and 42 feet high, with galleries about it (insects, minerals).

"The main portion of the ethnographical collection is arranged by classes, as in the museum at Oxford (see p. 533). The cases are of mahogany, and also black, with panes of plate glass, 8 feet high, 40 inches broad, and 1 foot 7 inches deep, with sea-green background, and similar shelves, which show up the contents very distinctly. The labels are printed in black letters on a white ground pasted on a red-bordered card. Nearly every specimen has a label. The exhibit is very clean, intelligible, and elegant. The entire museum can be lighted by electricity, a portion of the lights being supported by brass mountings in the modern pendant style. In the dark adjoining room are placed apparently such parts of the ethnographical section as could not find place in the main hall without injuring its fine general effect, or whatever was unsuitable for exhibiting. This room represents the storehouse of the exhibition series. Eastern Asia and India are especially well represented, but there is also a fine Benin collection (see Seventh Annual Report, 1897, pp. 18, 19, Plates II-V), as also some things from New Zealand.

"In the zoological collection there are three fine animal groups, the elk, the walrus, and the polar bear."

BRITISH FIRE-PREVENTION COMMITTEE.

I should not omit mentioning an institution, praiseworthy and of unusual importance to museums, namely, the British fire-prevention committee, which has issued publications since 1898. These may be obtained at the offices of the committee (No. 1 Waterloo place, Pall Mall, London). The contents of the volumes bear upon the comprehensive functions and purposes of the society, as may be witnessed by a few of the titles here given: I (ten articles with many illustrations, 1898, \$2). Fire-resisting floors used in London; Lessons from fire and panic; How to build fireproof structures. II (ten articles with many illustrations, 1900, \$5). Fire tests with unprotected columns; Fire tests with floors; Fire tests with ceilings. III (ten articles with many illustrations, 1900, \$5). Fire tests with doors; Fire tests with partitions; Fire tests with glass.^a The chairman of the committee and the publisher of its reports is Architect E. O. Sachs, London.

It will be seen that I have treated in the above pages only a small portion of the London collections, and that portion only in the most cursory manner.

^a There appeared also in 1902 two volumes, with 219 and 226 pages and very many plates, under the title *Facts on Fire Prevention: The results of fire tests conducted by the British fire-prevention committee*. Edited by Edwin O. Sachs, architect, London. B. T. Batsford, 94 High Holborn.

VI.—OXFORD.

20. UNIVERSITY MUSEUM, ETHNOGRAPHICAL DEPARTMENT (PITT RIVERS COLLECTION).

In Oxford, that famous old university town, which I visited first in 1878, the chief attraction for me this time was the famous ethnographical collection presented to the Oxford Museum in 1884 by Col. Lane Fox (later General Pitt Rivers), who died in 1900. Subsequently Colonel Fox founded a new collection in Farnham (Wiltshire), not far from Stonehenge, which has become quite as noted, but which, as it was too far away for me, I did not visit. The ethnographical collection is in an annex added in 1887 to the university museum, a modern

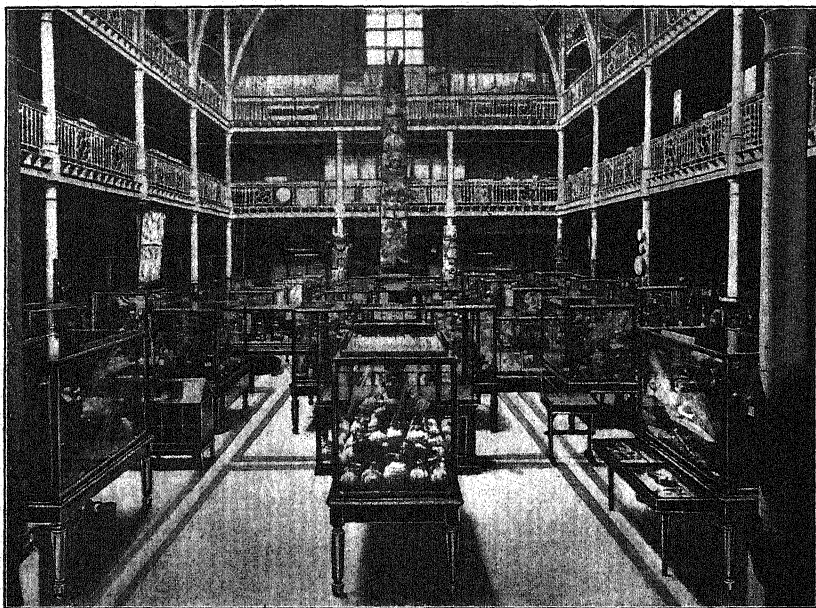


FIG. 84—University Museum, Oxford. Ethnographical section. (Pitt Rivers Collection.)

gothic structure (1857–1860). I pass over the natural-science collections, as I have no special remarks to make regarding them.^a The ethnographical collection, however, is distinguished from all other similar ethnographical collections in the world by the manner of its installation.

“In all ethnographical museums a geographical classification is adopted as the principal basis of arrangement, whereby all objects from the same region are grouped together—a system obviously

^aProf. E. Ray Lankester, of the British Museum, said in 1897 concerning the building of the Oxford University Museum: “Our great university museum building is simply an absurdity.” *Report Proceedings Museums Association*, 1897, pp. 21–22 (1903).

advantageous from many points of view, and especially to students of comparative ethnology, as showing at a glance the condition of culture to be found in any tribe, race, or district. In the Pitt Rivers Museum, on the other hand, the primary basis of classification which is adopted and which distinguishes it from other kindred museums, is one like that employed in the arrangement of most natural-history museums, the objects being grouped according to their morphological affinities and resemblances (as it were), all objects of like form and function being brought together into groups, which again are subdivided into smaller groups—into genera and species, as one might almost say.” (See Balfour’s remarks in Report Museums Association, 1897, p. 51.) There is only one larger natural-history museum that is arranged geographically, and that is the Agassiz Museum of Comparative Zoology in Cambridge, in the United States, which on that account became famous during the life of its originator. Its reputation can not now be claimed to so great an extent, since, although it is otherwise so important in the scientific world, it has not in this one respect kept abreast with the times. There is, however, an example on a small scale of geographic classification of a zoological collection, which I shall mention beyond under Dublin. It is therefore possible to study in the Oxford collection, so to speak, the natural history and the phylogeny of the various arts and industries of mankind. To this end Pitt Rivers, so far as possible, associated in groups all like objects from the various parts of the world in which they occur. By means of such synoptic series, when fairly representative, geographical distribution of any class of implements, weapons, etc., may be seen and the relative condition and local variations of kindred or similar objects may be studied and views formed as to the important question of the monogenesis or polygenesis of certain widely distributed arts. The probable lines of dispersal where they have apparently emanated from one center, may be determined upon incidentally, of course, helping to throw light upon the migrations of races themselves. Moreover, by arranging the specimens in each group in progressive series—that is, by commencing with those objects which appear to be the most primitive and general in their class, and by leading gradually up to the higher and more specialized forms, the developmental history of the higher forms may be at any rate suggestively illustrated and material be supplied for the study of the growth of culture. We are enabled to form some conclusions as to the variations by which progress in any given art or industry has step by step been affected.^a Inasmuch as the prehistoric status of civilized peoples, corresponding to that of our present lowly-cultured races is included, one learns to understand better the relics of former times that have remained to cultivated

^a Report Museums Association, 1897, p. 52.

man. Ethnography thus develops into an eminently historical science. Maps, such as show the geographical distribution of the bow, etc., explanatory sketches and photographs, contribute to a better understanding of the specimens. Such an arrangement is unusually fascinating and suggestive, but it should not be without an adjoining collection geographically installed. Only a great ethnographic museum like the Berlin Museum could carry out both classifications. A very limited representation of this could formerly be seen in the Dresden nephrite collection, and additional attempts have been made in the collection of the East Asiatic Ceramics from the shores of the Indian Ocean, as well as in the collection of ear and arm ornaments.



FIG. 85.—University Museum, Oxford. (Pitt Rivers collection.) A corner of upper gallery.

But imagine the great mass of ethnographic objects from all the peoples of the earth arranged in this manner. To present an idea of what this is I give below the principal groups of the system, the fundamental principles of which were laid down by Pitt Rivers, but which have since been developed by the present director, H. Balfour. The small subdivisions number many hundreds. Pitt Rivers originally had his collection in his own private house (he was then called Lane Fox, only changing his name upon coming into his father's estate), but as it increased he lent it to the Bethnal Green Museum in London, a branch of the South Kensington Museum, where I saw it in 1878. From there it was later transferred into the last-named

museum, until it was deposited in Oxford. In 1877 there was published a very valuable printed catalogue by Lane Fox.^a

Since then, however, the collection has increased, mostly through donations, and only slightly by purchase and exchange. The annual expenditure of the ethnographic section of the university museum is only \$1,000, from which also an assistant must be paid, and occasional smaller sums allotted for additional purchases. Under these circumstances its progress is all the more remarkable.

Figs. 84 and 85 give representations of the interior. The Gothic building with skylights is not very suitable and is in some respects unattractive and unadapted to museum purposes (see, for example, fig. 85, part of a gallery). That the Gothic style is suitable for museum buildings is demonstrated by several American examples (University of Chicago, see p. 491), but it must be applied in a very different manner than in Oxford, where the typical Gothic halls are found without modification.

The system is as follows:

PRINCIPAL GROUPS OF SPECIMENS.

I. PREHISTORIC:

Grouped by period...	<i>Paleolithic period:</i> British Islands, France, Egypt, India, Africa, Tasmania (recent).
	<i>Cave period.</i>
	<i>Kitchen middens,</i> ancient and modern
	<i>Neolithic period:</i> British Islands, France, Swiss and Italian lakes, Italy, Greece, Scandinavia.
Grouped by form and locality.	<i>Stone celts</i> (axes and adzes) in geographical and morphological groups.
	<i>Hammer-stones, pounders, rubbing-stones, etc.</i>
	<i>Cores and flakes, worked-flakes.</i>
	<i>Scrapers.</i>
	<i>Knives, lance-heads, etc.</i>
	<i>Arrow-heads.</i>
	<i>Manufacture of stone implements, methods used.</i>
	<i>Natural-forms.</i>
Use of bone, ivory, and horn in manufacture of implements—	<i>Modern gun-flint making.</i>
	<i>Forgeries.</i>
	<i>Hafting of stone and shell implements.</i>
Bronze age—	
Age of copper.	
Age of bronze, <i>celts</i> (development of forms), knives, razors, chisels, daggers and swords, spear-heads, arrow-heads, mace-heads, rings, miscellaneous.	
Iron age: <i>Early axes and adzes, spear-heads and arrow-heads, swords and daggers.</i>	

^a Catalogue of the anthropological collection lent by Col. Lane Fox for exhibition in the Bethnal Green Branch of the South Kensington Museum, 1874, xvi, 184 pp., 14 plates.

II. ARTS OF LIFE:

War and the chase: *Clubs; boomerangs; spears and lances; instruments for throwing spears; arrows, quivers; bows (plain and composite), cross-bows, bullet-bows, blow-guns; archers' arm-guards, bowstring pullers; many-pointed spears; harpoons; slings, bolas, axes, and adzes; halberds; glaives, etc.; swords; daggers and knives; fighting-rings (cestus, etc.); fire-arms.*

Defensive arms: Parrying-sticks and shields, body-armour, helmets.

Food: *Fishing appliances, traps, agricultural implements, grinding-mills, cooking utensils, strainers, etc.*

Fire making (domestic and ceremonial); *Illumination (lamps, candles, torches).*

Pottery: *Handmade pottery, wheel-made pottery, varieties, substitutes for pottery.*

Clothing: *Covers and garments, head-gear, foot-gear, umbrellas and sun-shades, fans and fly-whisks, spinning, string-making, string and net-work.*

Locomotion: *Wearing; basketry; bark cloth; wheel and other transport; skates and snowshoes; navigation (boats, ships, paddles, etc.); horse gear (harness, bits, shoes, spurs, stirrups); whips and flagella; staves; cradles and baby carriers.*

Domestic appliances, etc.: *Tools (cutting, sawing, drilling, rasping, etc.); spoons, forks, knives; locks and keys; measures of weight, time, etc.; currency; writing and primitive records; dwellings; head rests; surgical appliances, medicine; metallurgy (bronze, iron).*

III. ARTS OF PLEASURE:

Personal adornment: *Toilet gear, mirrors, combs, cosmetics; tattooing; artificial deformation (head, feet, lips, ears, nose); hair and hair dressing.*

Personal ornaments: *Ornaments of shell, bones and teeth of animals, vegetable substance; armlets and leglets; belts and sashes; pouches, beads and bead-work; feather work; torques; rings; penannular rings; fibulae; ring brooches; pins; cloak fasteners.*

Tobacco and hemp smoking, etc.: *Narcotics and stimulants.*

Musical instruments: *Percussion (rattles, gongs, bells, drums, etc.); wind (syrinx, whistles, reed instruments, trumpets); stringed (musical bow, harps, zithers, dulcimers, guitars, fiddles, etc.); masks (dancing, ceremonial, dramatic).*

Art: *Graphic and plastic art; development of ornament and patterns; animal form in art; human form in art; zoomorphic, phyllo-morphic designs; geometric patterns; loop, coil, and fret patterns; influence of textiles on designs, etc.*

IV. MAGIC AND RELIGION:

Magic, sorcery, etc., divination; primitive religion; oriental religions; ex votos; treatment of the dead; war trophies.

V. CEREMONIAL IMPLEMENTS.

OBJECTS COLLECTED DURING CAPTAIN COOK'S VOYAGES.

The valuable Cook collections are still kept together in a special series, for which we should be the more thankful since there are but few traces found in museums of this early stage of ethnographic science relating to the time of the first contact of Europeans with the South Sea Islanders.

The arrangement of the collection is of such a unique character that a thorough study, to be satisfactory, should be pursued for at least

several weeks. On account of the wealth of its contents, and the thoughtful manner in which everything has been brought together and arranged, it is hard to portray it graphically. The collection is extraordinarily complete in typical specimens, as a continuous effort is made to fill every gap. Very little has been published concerning these systematic series. The museum issues annual reports. The installation, arrangement in detail, and labeling still leave something to be desired, as is also true of the cases, which, being of the South Kensington pattern, are somewhat primitive.

The Oxford Ethnographic Museum seems to me to be in the first rank of establishments of its kind. I confined my attention in Oxford to the examination of this museum.

VII.—BIRMINGHAM.

21. CORPORATION ART GALLERY AND MUSEUM.

Birmingham has a population of more than half a million people. In the rear wing of the council house, built in 1878, in the Greek style, at a cost of \$1,250,000, is located the Corporation Art Gallery and Museum. The rooms are large, insufficiently lighted with skylights, and in the largest hall is found a gallery. It resembles in its contents, arrangement, and general mode of administration, the South Kensington Museum in London, which has served as the pattern for many English museums, and which also often lends its collections to these similar institutions. On account of the very great smokiness of this large manufacturing city the interior of the Birmingham museum is blackened and not very attractive. On four days of the week it is open from 10 a. m. to 9 p. m.; on two, from 10 a. m. to 6 p. m. or 4 p. m., and on Sundays from 2 to 5 p. m. For several years, practically all over England, the museums have been opened on Sundays. That the exhibits are damaged by such a continuous lighting is certain, though in this respect it only shares the fate of all English and American collections.

In 1900 a university was founded in Birmingham, for both sexes, having an endowment of \$3,000,000 and an appropriation by the city and state of \$55,000 annually. There is also a library, founded in 1861, containing 260,000 volumes, with a yearly expenditure of \$87,000, which daily circulates upward of 4,000 volumes. I devoted no time to these two institutions,^a since the university is hardly organized and the library is not modern.

^a For information see *Minerva*, XI, pp. 100-102, and J. J. Ogle, the Free Library, 1897, pp. 173-182; also F. J. Burgoyne, *Library Construction*, 1897, pp. 144-146.

VIII.—MANCHESTER.

Manchester is an incredibly smoky city, with over three-quarters of a million inhabitants. Dresden, which suffers a like disadvantage in Germany, is a veritable paradise in comparison with it. We are compelled to pity the development of culture which ripens under such circumstances, and which transforms human habitations into hells. A noble citizen of Manchester, T. C. Horsfall,^a took it upon himself to attempt to improve the conditions by both voice and pen, although there is no probability that he will be successful. I mention among others the following of his writings: *The Relation of Arts to the Welfare of the Inhabitants of English Towns* (1894, 26 pp.); *The Government of Manchester* (1895, 46 pp.); *An Ideal for Life in Manchester Realizable if—* (1900, 24 pp.), and *The Use of Pictures in Education* (1902, 28 pp.). In the second paper mentioned he writes on page 10:

I do not think that in any other country so large a part of the race has been brought in stature and general build so far below the normal stature and build of the race as has been the case in east and south London and in the poorer parts of all our large towns; ^b while the continued prevalence of drinking and licentiousness, and the rapid spread of betting and gambling show that the average mental and moral state is no better than the physical. * * * The vast Roman Empire fell for lack of men and the vaster British Empire, however numerous the British people may be, must also fall for want of men if we continue to allow the health of the bodies, brains, and hearts of the people of our towns to be sapped as they are now being sapped in a great part of Manchester.

And in the last-mentioned paper, page 4:

The condition of the town—the condition of all large English manufacturing towns—is simply terrible. * * * Ever since I went abroad, for the first time after reaching manhood, I have felt convinced that, whatever other reasons there may be for our not being loved, the light apparently thrown on the true nature of the belief, which England professes to hold, that she is the great civilizer of the world, by what the greater part of London is and what Manchester and all other large manufacturing towns are, and are allowed by the well-to-do classes in this, the richest country in the world, to continue to be, is in itself sufficient reason for our not being loved or respected, and for our being regarded as the nation which is of all the most wishful to deceive itself and others. * * * With all that is sound in his (that is, the King of Ashanti's "poor bloodthirsty King Prempet") nature he would know that the life of an unsacrificed Ashanti is preferable to, and only nominally less civilized than, that of the Ancoats rough and of those rich persons who are willing to allow their countrymen to be Ancoats roughs.

Ancoats is a suburb to the east of Manchester and has a museum—Manchester Art Museum at Ancoats—which, in imitation of the Bethnal Green Museum in London, provides musical performances and

^a Mr. Horsfall received the honorary title of doctor at the semicentennial celebration of the university in 1901.

^b J. M. Rhodes showed at the meeting of the British Medical Association in 1902, that there die in Manchester 198 out of every 1,000 children, in London 154 of 1,000. See *Nation*, LXXV, 1902, p. 142.

lectures for the poor people of this section of the city and a primary school, for children from 10 to 14 years of age, in natural history, English history, and physical geography. More is done in this direction in England than in Germany, although it does not appear to me that the population is thereby any more enlightened than ours. It is rather the contrary. At all events, our school education is a better one, and this can not be brought about by influencing the adults.

All the buildings of the city are of a deep black, and this is coupled with a smoke-filled atmosphere.^a For this reason a great portion of the population lives miles away about the town, and tens of thousands may be seen coming into town in the morning and going out in the afternoon. That the interests of museums must suffer under these unfavorable conditions is obvious, so I am the more pleased to be able to call attention here to some noteworthy features.

22. MANCHESTER MUSEUM OF OWENS COLLEGE.

Owens College was founded by John Owens, a Manchester merchant, who died in 1846. Opened in 1851, it has an endowment of \$500,000. It is known as the University of Manchester, with 1,200 students of both sexes and 80 instructors, and constitutes a part of the Victoria University, which embraces Manchester, Liverpool, and Leeds, but has its seat in Manchester.^b A million dollars was collected by subscription, and the aggregate property of the schools amounts to \$3,750,000. In 1870, A. Waterhouse began the construction of a group of buildings in the Gothic style, which, as remarked under the heading of Oxford, is not well adapted for museums and the like, at all events, when it is not restrained. Mr. Waterhouse, who is one of the most noted architects of England, also designed the new town hall in Manchester, built during 1868-1877, at a cost of \$4,000,000, and the assize courts, built in 1864 at a cost of \$500,000, both in the Gothic style. In the town hall, which has 314 rooms and a tower 93 meters high, one is at once convinced of the unsuitability of this architecture when looking at the dark stairways and passages where artificial lights must be employed even on bright summer days. The present museum building was constructed during 1886-88. I do not give an exterior view of the structure, which is in the same style as the other buildings. Quite recently a large hall (Whitworth Hall) has been erected adjoining this, at a cost of \$225,000, for which, however, the Gothic style is in every way well suited.

The Natural Science Museum of Owens College (the university), under the curatorship of W. E. Hoyles, embraces mineralogy, paleon-

^a Mr. Horsfall also speaks, in a paper published in 1903, of the horrible filthiness of the air.

^b A movement is now on foot to establish separate universities in the three cities named.

tology, botany, zoology, anthropology, archeology, ethnography (also numismatics), and is well administered. The large ground floor hall, 100 by 50 feet in dimensions, with side lights on the right and left and with cases at right angles with the walls, is well lighted by large windows (fig. 86). One is here again convinced that this is the only proper method of museum lighting, since the halls on the second floor, with skylights and two galleries, one above the other (fig. 87), are poorly lighted and suffer under reflections from the glass of the cases. The main stairway leads only to this story with its large rooms, 100 by 50 feet floor space, 40 feet high, while the two galleries are reached by an inside stairway (fig. 87). The Gothic



FIG. 86.—Owens College, Manchester, England, Manchester Museum. First floor.

architecture has a disturbing effect and detracts from the impressiveness of the exhibits, which it overshadows. Then again, because of the façade, a difference in height, with steps, had to be introduced in the interior, which is inconvenient. Thus in the rear of the main halls already mentioned there is a transverse hall about 72 by 30 feet in size. The terrazzo pavement is not especially suitable, since, as elsewhere, it becomes broken. Nonelastic stone floors in museums are fatiguing to visitors. The wooden cases and cabinets are hardly up to strict requirements, though generally great care and consideration has been given to the installation of specimens. So many labels have been provided for the benefit of students that this museum really, in some portions, may claim to be "a collection of instructive

labels, each illustrated by a well-selected specimen," which is what an ideal museum should be according to the oft-repeated, clever, but paradoxical and erroneous, definition by G. Brown Goode in Washington.

In cosequence of this, it has little attraction for the general public, since the scientific atmosphere of the museum is not popularly pleasing. (During 1898-99 the attendance on week days was 30 to 372; on Saturdays and Sundays, 40 to 450; and the largest attendance for the year, on Easter Monday, was 952.) Especially well represented are the lower animals. The conchological collection is noteworthy. In the ornithological department I note, among others, 10,000 skins, the famous Dresser collection, which served as a basis for his ornitholog-

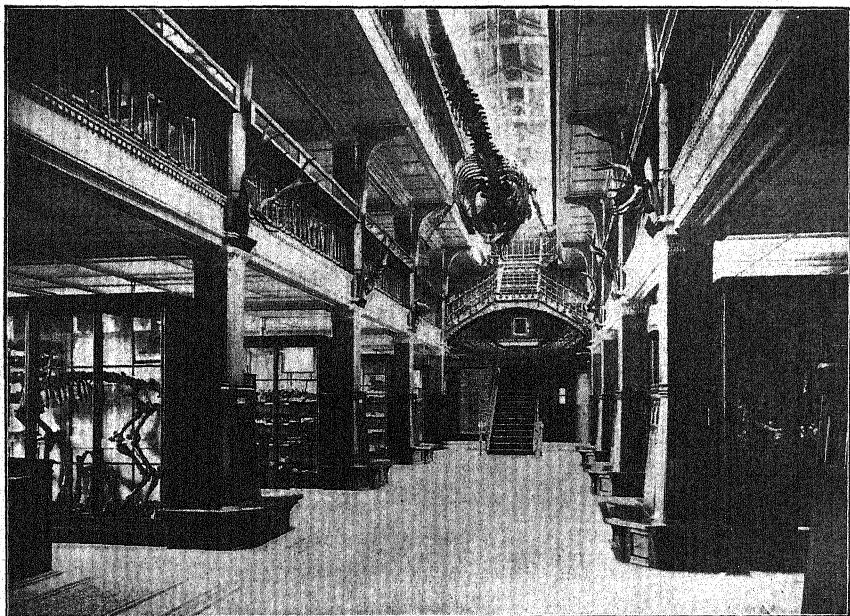


FIG. 87.—Owens College, Manchester, England, Manchester Museum. Second floor and galleries.

ical works (Palearctic Birds, Bee-Eaters and Rakes). This is well installed by itself in cabinets with drawers, but is exposed to danger from fire by reason of being housed in the attic, which is not fire-proof and contains much wood. This attic has only recently been added for the purpose. The ethnographical and anthropological collection is only in its infancy (Egypt, Peru, etc.), and is as yet stingily treated, on account of lack of funds. The library of the museum comprises 4,000 volumes and has a printed catalogue. The library of Owens College has 62,000 volumes and the school of medicine has 31,700 medical books.

There are employed six trained scientific men, one printer, three assistants, and two attendants. There are no preparators, all stuffing

and the like being done outside the museum by contract, which is the practice in most English museums (including the London Natural History Museum). The annual expenses are \$13,500, of which \$7,500 is spent for salaries.

From October to May about 25 popular lectures are given (admission free), for the most part in the museum, principally on Saturdays and Sundays, on the subjects of archeology, geology, mineralogy, zoology, and botany, some of which are intended for children (for example *On the Struggle for Existence in Nature*). The total attendance at these lectures amounts, however, to only about 2,500 persons.

The museum has published the following: Reports (annual) from 1895 on, six pence; Notes (six of these have appeared since 1896, but they are only reprints of magazine articles); Scientific Guides, partly illustrated (reprints from journals), 12 of which have appeared at prices from 2 pence to 2½ shillings; Popular Guides, general, with illustrations, in two editions, six pence, briefer, a penny; altogether 34 publications, some of which are also called handbooks. In addition, the museum has published labels such as those describing the subclasses and orders of mammals (15 shillings), Families of Mammals (10 shilling 6 pence), Families of Birds (10 shilling 6 pence), Families of Fishes (10 shilling 6 pence), Coleoptera (3 pence), Worms (six pence), and also maps showing geographical distribution (100 for six pence). This undertaking is deserving of much thanks, inasmuch as it saves the expense of printing to other museums; it is unfortunate that the German museums can make but little use of these labels, since they are partly printed in English. The Dresden collection, however, some time ago procured from them and installed the labels of bird families in Latin, printed in red. It has long been my desire to arrange for duplicates of the printed labels in the Dresden Museum for transmission to other collections so as to save them the trouble of preparation. The arranging of labels for public exhibition requires much time, as they should be brief, explicit, and complete. It is unfortunate that, up to the present time, every museum undertakes this vast labor of preparation, instead of utilizing some of the work done by others. I know a German museum that practically prohibits the copying of labels for use elsewhere. The English (regardless of the Manchester Museum) and the Americans have already begun to publish some of their printed labels.^a

For a description of Owens College in general, see *The Owens College, Manchester* (founded 1851). A brief history of the college and description of its various departments. Edited by P. J. Hartog. Manchester, 1900. Quarto, viii, 260 pages, 29 plates.

^a Reports Museums Association and Museums Journal.

The Manchester Museum of Owens College is among the leading museums of England, and has apparently a great development before it. In this insufficiently lighted Gothic building, however, it will hardly develop fully. It is now an excellently arranged study collection, and in its present quarters can remain only such.

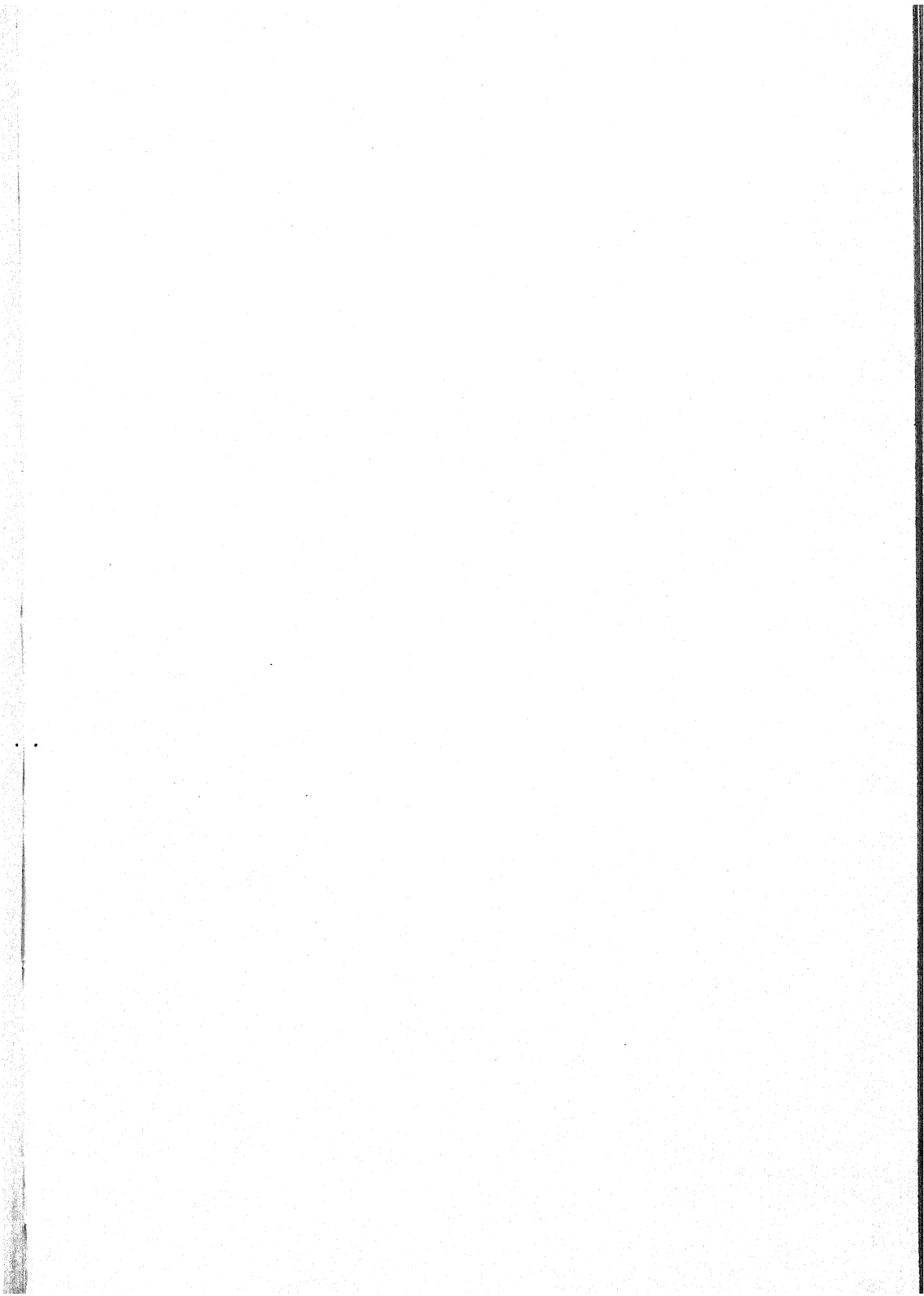
This museum also is open daily from 11 a. m. to 5 p. m. (to students from 10 a. m. on) and on Sundays from 2.30 to 4.30 p. m., besides each first Wednesday of the month from 7 to 9 p. m. when it is lighted by electric arc lights reflected from the ceiling. It is closed only on Good Friday and on Christmas Eve.

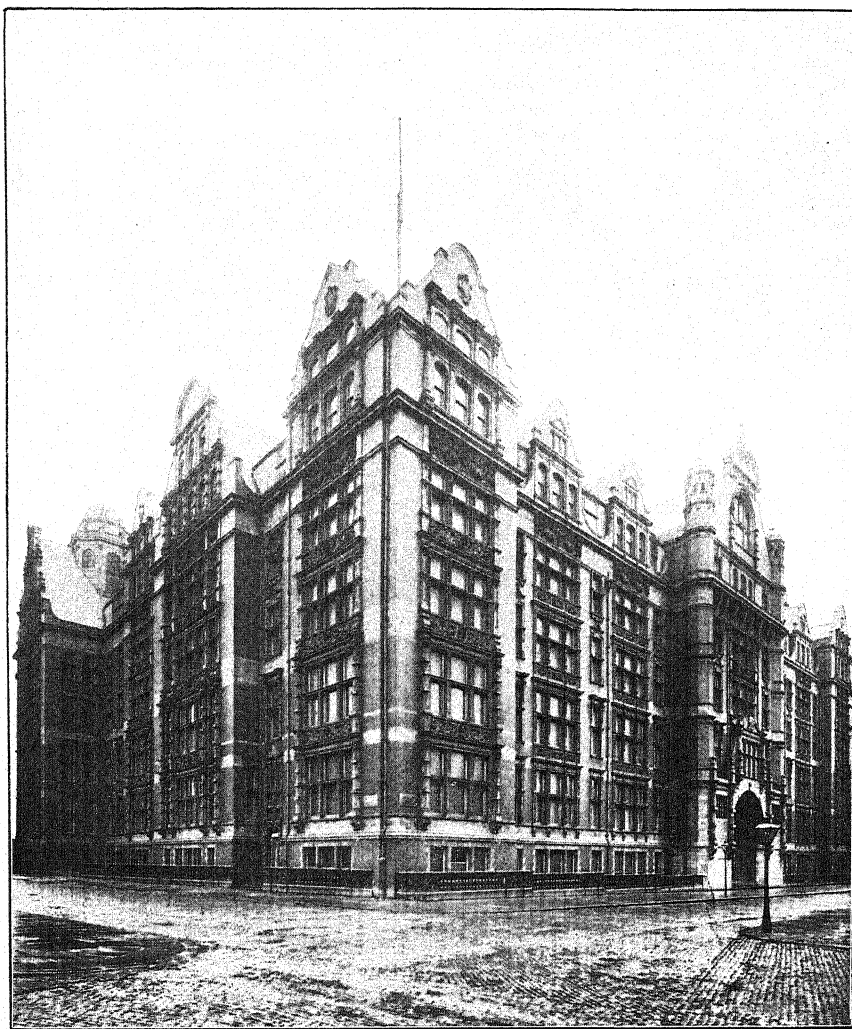
While no attention has been paid in the Museum building to ventilation, a very notable method of ventilation has been installed in the new physical laboratory of Owens College,^a by which no air is admitted through the windows, but is brought in from the outside through tubes over an oil bed, which clears it of dust. This may be well thought out theoretically, but does not appear to hold good in practice, and, besides, the windows do not close tightly, so that air carrying dust and soot comes in through the crevices. These windows are also arranged for opening and are opened at times. The installation is therefore imperfect. There is, however, always a thick crust of dirt on the oil, the air passing through the tubes over it with force before it enters the room. I shall revert later on to the question of air cleansing.

23. PEEL PARK MUSEUM IN SALFORD.

Manchester is divided into two parts by the river Irwell, the western portion being called Salford, with its own separate incorporation. High above a park is a good sized museum building in the Renaissance style, "for all," and a library (Royal Museum and Libraries). This was established in 1840 and was extended in 1853, 1857, and 1878. The whole is so blackened and soiled with smoke that I was necessarily most unfavorably impressed. There are a number of handbooks for sale (Art, Mineralogy, Geology, 27 pp.; Fine Arts Section: Marble Sculptures, Casts, Paintings, 32 pp.; Ethnography, 49 pp.) and a Popular Guide (8 pp.). All is done with the best intentions, but, owing to the lack of means, is of little avail. It is much more difficult in a manufacturing and commercial city like Manchester than elsewhere to impress the people in authority with the usefulness and value of good museums, so that they will grant the necessary funds for their maintenance.

^a Described in *Nature*, October 27, 1898, p. 621.





MUNICIPAL TECHNICAL SCHOOL.

Manchester, England.

24. VARIOUS ART MUSEUMS.

WHITWORTH INSTITUTE.

The Whitworth Institute is a museum of art and industry in Whitworth Park. It contains a picture gallery, a commercial museum, and the like. It is insufficiently lighted, but is not unattractive in its interior decorations. In the basement, engravings, drawings, etc., are exhibited with excellent results by means of Luxfer prism window panes, the room being lighted by a single row of windows. I have discussed this under New York (see p. 387), and have made an experiment with them in the Dresden Ethnographic Museum. This arrangement is also utilized to advantage in the Royal Armory in Berlin.

MUNICIPAL SCHOOL OF ARTS.

[Cavendish street.]

The Municipal School of Arts, established in 1842, has a small but very tastefully arranged art collection, brought together in 1898 in a building erected by J. G. Sankey. The illumination from above is not, however, satisfactory. There are 1,300 pupils.

CITY ART GALLERY AND MANCHESTER ART MUSEUM.

The City Art Gallery and the Manchester Art Museum, in Ancoats (a suburb), I could not visit. The museum lends framed pictures to elementary schools, generally in lots of 12 at a time, in every case for a half year. It possesses over 3,000 pictures for this purpose and supplies 92 schools, but is endeavoring to fill also the wants of the remaining 215 elementary schools of Manchester. This museum, under the direction of its founder, T. C. Horsfall, has a very far-reaching usefulness. (See also T. C. Horsfall: *The Use of Pictures in Education*. Manchester, 1902. 13 pp.)^a

25. MANCHESTER MUNICIPAL TECHNICAL SCHOOL.^b

The Manchester Technical School is a very large and high structure, recently completed, of brick and terra cotta, with tasteful exterior, the main entrance in gray granite, designed by Messrs. Spalding and Cross, in free French renaissance style of the time of Francis I. It was erected at a cost of \$750,000, exclusive of the ground and furnishing. The building was begun in 1895. There are 5,500 evening pupils, 150 instructors, and 150 persons employed in other capacities. As a building it is very noteworthy. All of the rooms face the street,

^aAnd Handbook to the Manchester Art Museum, 81 pp., one penny, as well as *What to Look for in Pictures*, 1887. 24 pp.

^bSee also a description of the Municipal School of Technology, Manchester. The School Press, 1902. 27 pp. Quarto, illustrated.

and are consequently well lighted, while all corridors look out upon the courtyards. Its interior, treated primarily with regard to its usefulness, is, nevertheless, decorated with the most marked artistic taste,

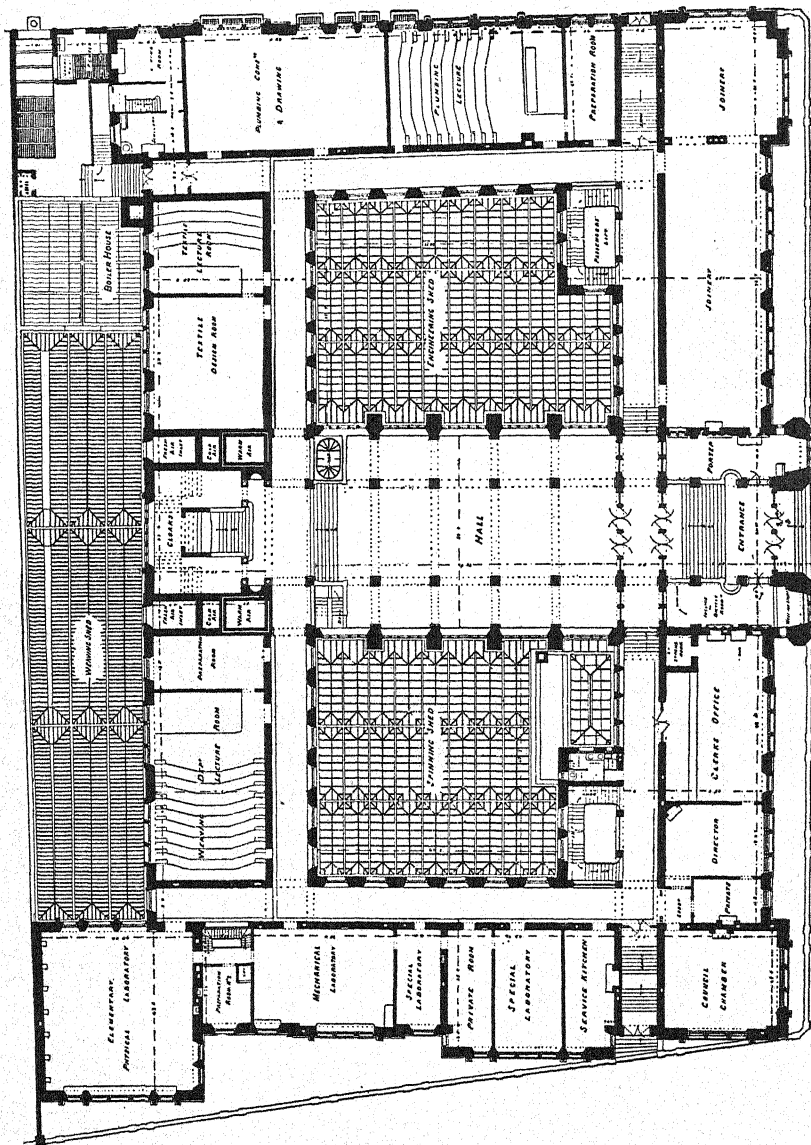


FIG. 88.—Municipal Technical School, Manchester, England. Plan of first floor.

and I note particularly the application of glazed bricks of a fine dark-brown color (Burmantoff's glazed bricks from the Leeds Fire Clay Company Limited, in Leeds), which are also employed at the base of the exterior of the building. In the English climate, which is mild as com-

pared with that of Germany, these glazed bricks stand exposure to the weather, and I believe that they would also stand our more vigorous winters, since they are likewise used quite extensively in America, where the winters are even more severe than with us. On the interior brighter, light-colored glazed bricks are used, but for economical reasons they do not extend the entire height of the rooms and corridors, the upper portion being unglazed. The fire-places are made of Burmantoft's faience, supplied by the company already mentioned. Colored glazed bricks are used in Manchester and elsewhere in England to a considerable extent in monumental structures; at all events, much more than with us. In many cases exceedingly fine effects are thus obtained, as in Manchester, for example, with the light-green and light-yellow brick from the Pilkington Company, in the building of the Tootal Broadhurst Lee Company (Limited), 56 Oxford street, and in some of the large new bank buildings in the neighborhood of the town hall (National Provincial Bank of England, Merchantile Bank of Lancashire, both in York street, the latter furnished by the Malkin Company). I found these very attractive when of uniform color, and there are also some that are really tasteful, in a simple manner ornamented with color. The technique of glazed brick has certainly progressed well in England. It is well to advise every architect who has a museum building to design to examine into these things. I obtained two illustrated catalogues and price lists from the following firms: The Malkin Tile Works Company (Limited), Patent Encaustic Tile Manufacturers, in Burslem, Staffordshire, 62 Market street, Manchester; and Pilkington's Tile and Pottery Company (Limited), Clifton Junction, near Manchester, 37 Cross street, Manchester (these, in part, illustrated with some very artistic prints from drawings by Walter Crane, M. Mucha, J. R. Cooper, Lewis F. Day, John Chambers, C. F. A. Voysey, J. H. Rudd, and others). Another large factory is that of Doulton & Co. (Limited), Lambeth, London. I believe these glazed bricks may be very well utilized in the interior decoration of a museum. In collections, however, in which many objects must be hung on the walls, wooden appliances are needed, which are easily made. In the technical school in Manchester very beautiful, not overdecorated colored glass windows are also employed.

Of most decided importance is the method of ventilation employed in the new building of the technical school in Manchester. It is the same as referred to in my report on Chicago, see p. 484, and which rests upon the principle that only screened (washed and cleaned) air, permeated with steam and heated *ad libitum*, is brought into the building ("plenum system"). This building is one of the few in Europe (some others will be mentioned in the course of this report) that has introduced this important method, the only proper and necessary

one for museums, and I deem it of the utmost importance that only this be employed in all new museum buildings. In the technical school, moreover, all the windows can be opened without any unclean air penetrating from the outside, since the pressure of the air in the interior of the building is always greater than that from without. I inspected the great shafts and ventilators (see fig. 88). It is here applied in a very elaborate and expensive installation, such as is required for sanitary purposes in a largely attended school, but it is also to be recommended for museums and libraries for the same purposes, and especially to preserve the collections from dust and other damage. In such an exceptionally smoky city as Manchester this installation is even of greater importance than elsewhere.

The new technical school is in the first rank in every respect. The building cost the city \$1,250,000. One of the highest American authorities on this subject (Edward Atkinson, in Boston, of whose labors I shall make mention in the continuation of my *American Studies*) recently referred to it in the following words:^a

I may add that I found in Manchester the most complete and well-devised building for technical instruction in science, including special departments for the textile arts, that I have yet seen.

Before the construction of this school a commission inspected the technical schools, institutions, and museums in Germany and Austria and published a report in 1897, in which, among other things, the following occurs (p. 16):

There are not elsewhere in the whole world such splendid collections as are to be found in the British Museum and in South Kensington; but then you can hardly go into a continental, and certainly not into a German, town, even of minor importance, without finding a beautifully ordered and representative museum, suited to the needs of the city and its neighborhood, and often not one merely, but another of a quite special character should circumstances require it.

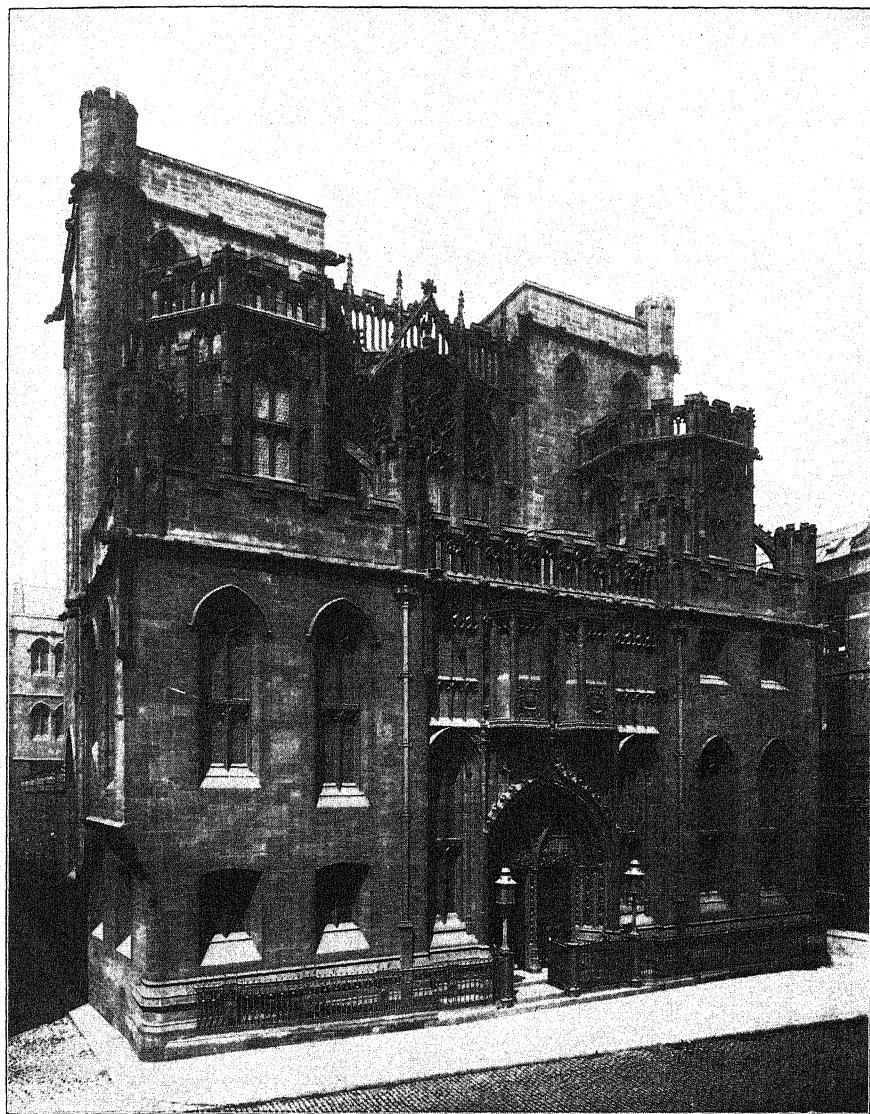
I believe, however, that in our German museums there is much that is capable of improvement.

26. JOHN RYLANDS LIBRARY (DEANS GATE).

The John Rylands Library was donated to the city as a free library by Mrs. Rylands in memory of her late husband, and opened in 1899. Built of red sandstone in the Gothic style, in 1890, by B. Champneys, it cost \$1,500,000. It contains 70,000 volumes, valued at \$1,250,000, including^b perhaps the best collection of incunabula in existence. It is the valuable library purchased by Mrs. Rylands in 1892 from the Count Spencer in Althorp, comprising the Althorp Library, together with other treasures. The library has at its command for the pur-

^a Boston Manufacturers' Mutual Fire Insurance Company Circular, No. 79, November 5, 1901, p. 6.

^b Library Association Record, I, 1899, p. 567.



JOHN RYLANDS LIBRARY.
Manchester, England.

chase of books the sum of \$24,000 annually, and from this fund the increase approximates 10,000 volumes yearly, but as the building is so arranged that it can scarcely be extended, and as it is already filled, they hardly know how to meet this difficulty.^a

A more attractive building is hardly imaginable, nor one less suited for a library, in which the readers must be supervised. Disregarding all the experiences gained by libraries and all library principles, the architect, following the wish of Mrs. Rylands, designed a magnificent Gothic structure similar to the library of Mansfield College in Oxford. The entrance hall is a perfect forest of columns, uncommonly attractive artistically, but entirely useless, for the hall is so narrow and dark that it must be artificially lighted in the daytime.^b The entire building is in the style of a church, and, imposing as it appears in its main nave (23 by 160 feet long, 50 feet high), in its side chapels, so to speak, or alcoves, in its galleries and transepts, it is so dark that at 3 o'clock in the afternoon in September electric lights had to be turned on throughout. The books are not arranged in accordance with modern library methods, as one might expect, but in cases, the same as has been done from olden times, only the reference library being directly accessible to the visitor. These cases, built of oak, with brass door frames and plate glass, are delightful. They close perfectly and are dust proof as long as the wood does not warp. Such an ideal and magnificent arrangement is certainly not to be found in many places; but, as I have already remarked, the library is full, and, in view of the difficulty of adding to this building, it will in the course of time be necessary to abandon this elegant installation. The plate-glass doors of the cases are 10 feet high and 2 feet wide, and in the grooves are rolls of velvet with an inclosure of wool to make them dust proof. The librarian is of the opinion that in consequence of the complete air-tight closing of the cabinets, the majority of the costly books become moldy, and it is therefore necessary for him to ventilate the cases by leaving the doors open from time to time. I do not share his opinion^c and I believe,

^a F. J. Burgoyne, *Library Construction, Architecture, Fittings, and Furniture*, London, 1897, p. 128, says, in the chapter *The Architectural History of the British Museum Library*: The history of all library architecture is pregnant with two especial morals—the need of building from the first upon some well-considered plan, so prepared as to admit of harmonious development in the future, and the necessity of making extremely generous estimates in respect of space. Unless in the case of libraries devoted to special classes of books, or of branch libraries controlled from the parent institution, or of libraries where books no longer in general demand are systematically sold off, space, unless the most effectual measures have been taken at the very outset, must become the librarian's master. The architectural history of the British Museum is to a considerable extent a history of struggle against circumstances created by neglect of these elementary principles.

^b See my preceding remarks on the dark stairways and passages in the townhall designed by A. Waterhouse.

^c See the remark, p. 461.

moreover, that the books mold because the building was occupied too soon and is not yet dry. Everywhere, even in the small workroom of the librarian, it smelled musty and gave the impression that the

building is damp. I attribute the molding to this, and it may require years before the building will be thoroughly dried out in the moist English climate. In addition, the cases are so built in that it is impossible to provide air holes for them, but at all events it is important to definitely decide whether books are damaged in securely closed cabinets. I took occasion to inquire about this in the Library Sainte Geneviève in Paris (see p. 594) where I found the valuable incunabula, Aldines and Elzevirs in cases, but there the opinion is that the books are not injured by being kept in this manner. The wooden cases, however, do not close so tightly, and the library is 50 years old; furthermore, Paris is not as moist as Manchester. In the museum under my care we have had books since 1897 in air-tight iron cases, which give not the least indication of damage up to the present time. A number of experienced librarians

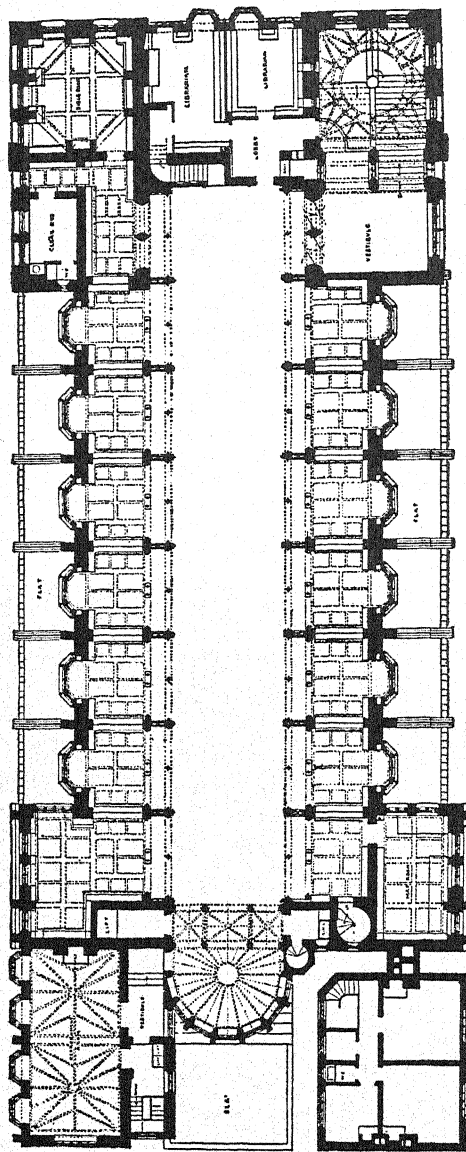


FIG. 89.—John Rylands Library, Manchester, England. Plan of second floor.

whom I have asked, state as their opinion that a book is not damaged by being kept in an air-tight case unless the book be a freshly bound one, in which case it should be dried out for from one to two years before it is stored in this manner; yet, in the John Rylands Library

the very old bindings suffer in the same way. Books securely inclosed will not be more liable to damage than the stuffed skins of animals, and though the latter are thoroughly poisoned, this is not the case with insect collections. At any rate, at the Dresden Museum, where the insect collection is installed in air-tight iron cabinets, no injury has been done to it up to this time.

Still more interesting than this subject is that of the ventilation. The system installed is as in the technical school, so that only cleansed air is introduced into the building. Here the windows are arranged so that they can be opened; but too little pressure has been allowed for the incoming or outgoing air, and in consequence the rooms are stuffy. There appeared to be no remedy for this except to make casements or valves in the windows to let the air in from outside, and consequently the entire costly ventilating apparatus is rendered superfluous.^a This difficulty could doubtless be remedied if the flues were altered, but only with great difficulty, since all of the tubes and shafts are so buried in the stone in the Gothic structure that it could not be accomplished without greatly damaging the entire building. As a result the ventilating arrangement was abandoned and unclean air is now admitted from the outside into this "jewel box," so that it will soon be damaged by smoke and soot, and the costly books with their precious old bindings will suffer.

Hot-water heat is employed, and the air which is forced in is strained through cotton. It is not, however, washed, though previously warmed as it passed over the hot pipes. An electric-light system throughout dispenses with the use of gas, which is so detrimental to books.

The building is fireproof, constructed entirely of stone, and almost entirely vaulted. The floors have two fireproof layers with a space between, though covered with oak wood. So much wood has been introduced into the building itself, exclusive of the wooden cases, that a fire starting on the inside and not immediately detected might lead to the destruction of the valuable books. If the cases were of iron, even though the excellent American library installation should not be adopted, and so much wood had not been utilized in the interior decorations for the purpose of increasing the æsthetic effect, this danger would have been obviated. The location of the building in the center of the city, closely surrounded by houses, makes the danger still greater. The architect belonged to those who have foremost in their mind the building itself and not its purposes and contents. How justice can be done to the people and to the objects for which the building is designed, that is another question.^b

One of the special features, besides the collection of 2,000 rare block-printed books and first impressions (nearly all antedating 1480), is that

^a See p. 484 under Chicago.

^b A brief description of the building is given in *Library Association Record*, I, 1889, pp. 686-688; the *Builder*, 1900, pp. 78-81, No. 2973.

of the Bibles (said to be second only to the Bible collection of the British Museum). Further, the collection of Aldines (over 800) is understood to be the most complete; and a collection of the earliest and rarest books relating to America and the early explorations in general should be mentioned. It is used very little as a purely scientific library in the great commercial city, and mostly by clergymen. It is open on week days from 10 a. m. to 6 p. m., Tuesdays and Fridays also from 6 a. m. to 9 p. m., Saturdays only until 2 p. m., and is closed on Sundays and on ten week days during the year. A 3-volume printed catalogue (1899) and various printed section catalogues have appeared.

In England, as in America, organizations, societies, etc., are much more privileged than with us in visiting public institutions and in being shown through them. So it happened that on the day of my visit a society of young men and women with religious tendencies called or was invited on Saturday afternoon at 3 o'clock, at a time when the library is ordinarily closed. Several hundred persons presented themselves. They assembled in the large, elegant, paneled lecture room, and the director made an address in which he explained to them something concerning the history and the contents of the library and instructed them in the use of the books. All that he could say, however, in this connection was that, since the library was a scientific one, they would find help and encouragement for their religious interests only in the large collection of Bibles, and he advised them to use this section. The society was then permitted to wander at will about the large library. The visitors were attended by the director and other officials, and the noteworthy and valuable things were pointed out. All parts of the building were well lighted with electricity. This has assuredly the advantage of broadening the horizon of a class of people who have no conception of such a magnificent installation as a good library, and of inspiring one or another of them to go into the subject more profoundly.

27. FREE REFERENCE LIBRARY.

There were in Manchester also many other things to learn and to report upon,^a but my time was limited and the sojourn in this factory town but little pleasing.

So I did not visit the Free Reference Library in King street, which has been housed since 1878 in the old town hall (constructed in 1823-1825), which contains 124,591 volumes, and in which during the last year 360,176 readers have consulted 441,074 volumes. The city would long ago have undertaken the establishment of a new up-to-date library, since everything is overcrowded, were it not for the fact that a debt of \$25,000,000 was assumed in the construction of the

^aSee C. W. Sutton: Some of the institutions of Manchester and Salford, *Library Association Record*, I, 1899, pp. 550-563.

ship canal between Manchester and Liverpool, besides large expenditures for electric light and trams. F. J. Burgoyne^a says:

It is strange that the town which was the first in Britain to obtain parliamentary powers to establish a public library should be content with a makeshift building as a home for its splendid collection of books * * * Manchester has lagged behind * * *

This library has five branch reading rooms and distributes at thirteen places in the city books for reading at home.^b It has altogether 292,167 volumes, which were used in the aggregate during the last year 2,181,596 times, a daily average of 6,128. There were taken home 1,022,511 books by 46,456 persons provided with cards, and 657,121 in the boys' rooms, five-sixths of whom were Sunday visitors. Since the number of readers in the newspaper rooms aggregate 4,117,684, we arrive at a total annual patronage of 6,138,996 persons. Even if we omit the 4,000,000 newspaper readers, there still remains a formidable number, and the proper administration of all this is certainly a remarkable performance. The annual expenditure by the city for the library amounts to \$108,000, of which \$44,000 are allotted to salaries and \$25,000 for books and periodicals.^c We must not overlook the fact that in the large number of books used as stated, of the 1,022,511 lent for home reading, 841,198 related to fiction, of which there are 62,915 volumes. In this respect all these libraries serve the same purpose as our German private circulating libraries, except that with us a fee must be paid, whereas with them the service is free of charge (compare also with the above what I have said in connection with the Chicago Public Library). In the Reference Library, on the other hand, there is no fiction, but only books on theology, philosophy (9,638 volumes), history, biography, travels (29,685), politics and trade (21,503), arts and sciences (22,422), literature (31,133), and patents (7,064). The consultation of 441,074 books by 360,176 readers in the last year is, as already stated, not only noteworthy from a technical library standpoint, but it may also be taken for granted that it has an influence on the education of the people of the city. At any event, nowhere with us in Germany are so many good books read by the people. The library has a printed catalogue and publishes periodical lists of its acquisitions. The "Manchester Public Free Libraries" were established in 1852.^d Of the other libraries of Manchester may also be mentioned the Portico Library, with 80,000 volumes (English literature, English topography, books of the eighteenth century). All in all, the public libraries of Manchester comprise 800,000 volumes.

^a Library Construction, 1897, p. 171.

^b The celebrated Boston Public Library has now (1903) 156 agencies for the delivery or reading of books.

^c See Forty-ninth Annual Report to the Council of the City of Manchester on the Working of the Public Free Libraries, 1900-1901, 27 pages octavo.

^d See also J. J. Ogle, The Free Library, 1897, pp. 158-165.

IX.—EDINBURGH.

Edinburgh, a city with more than 300,000 inhabitants, is a paradise in comparison with Manchester, but is itself more or less begrimed in consequence of the location of the great railway station in the center of the city. Were it not for this, Edinburgh, on account of its picturesque location, would perhaps rival the finest cities of the world. The town has only a few factories.

28. UNIVERSITY OF EDINBURGH.

The University of Edinburgh, with over 2,800 students and 170 instructors,^a is located in a stately building erected at the close of the eighteenth century. A dome has since been added (Plate 38). The

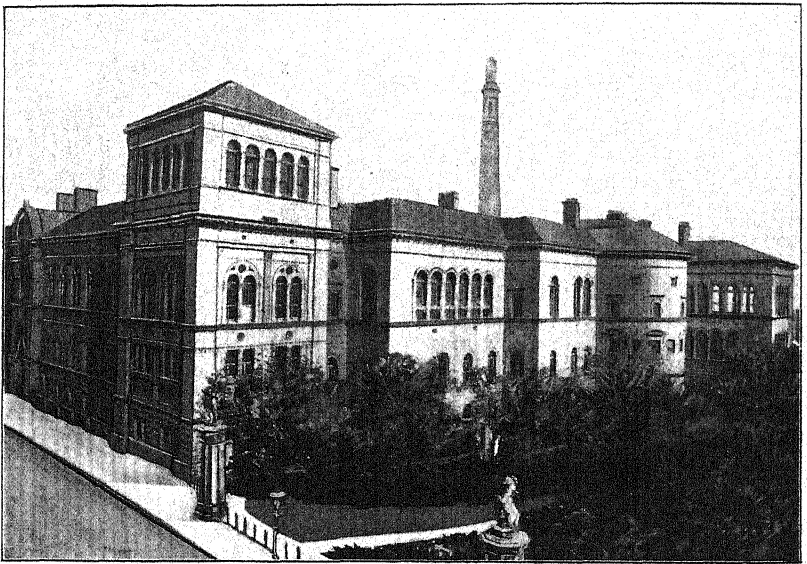
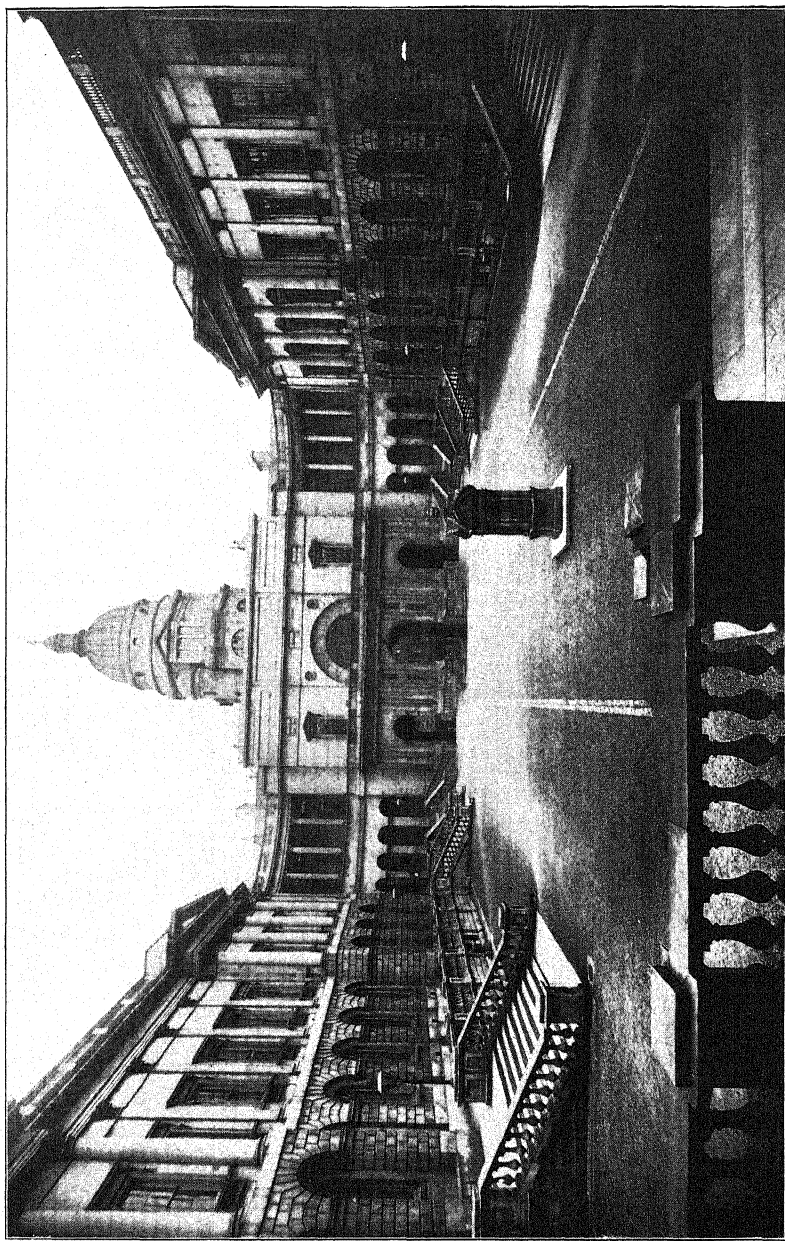


FIG. 90.—University of Edinburgh. Part of new university.

library, at the left, with 210,000 volumes, has an antiquated installation, but the main hall makes a magnificent impression. All of the public buildings of Edinburgh are conspicuous for their massiveness and strength. In this respect the students' clubhouse and the music school in the group of the newer university buildings (fig. 90) are noteworthy, and especially among these the Aula (McEwan Hall), which cost \$550,000, is one of the largest and finest buildings of the kind that I know.^b The new university buildings are about ten minutes distant from the old university, adjoining the school of medicine, opened in 1844.

^aLeipsic, in the half-year 1902 had 4,100 students (of which 439 males and 53 females were only "auditors") and 215 instructors.

^bAll of these buildings are not shown in fig. 90.



UNIVERSITY OF EDINBURGH.
Old University.

ANATOMICAL MUSEUM.

I could not inspect everything, and the Museum of Comparative Anatomy, under Sir William Turner, possessed most that was to my interest to visit. In 1720 Alexander Munro, then only 22 years old, was professor of anatomy here; his son, Alexander Munro 2d, occupied the same position for fifty years, and Munro 3d until 1846. He was succeeded by John Goodsir, and the latter in 1867 by W. Turner, all anatomists of world-wide reputation. The collection was founded by Munro 2d, and is unusually valuable. Turner, with R. Rowland Anderson, the architect of the entire School of Medicine, planned the new museum in 1876. It was designed and executed after the pattern

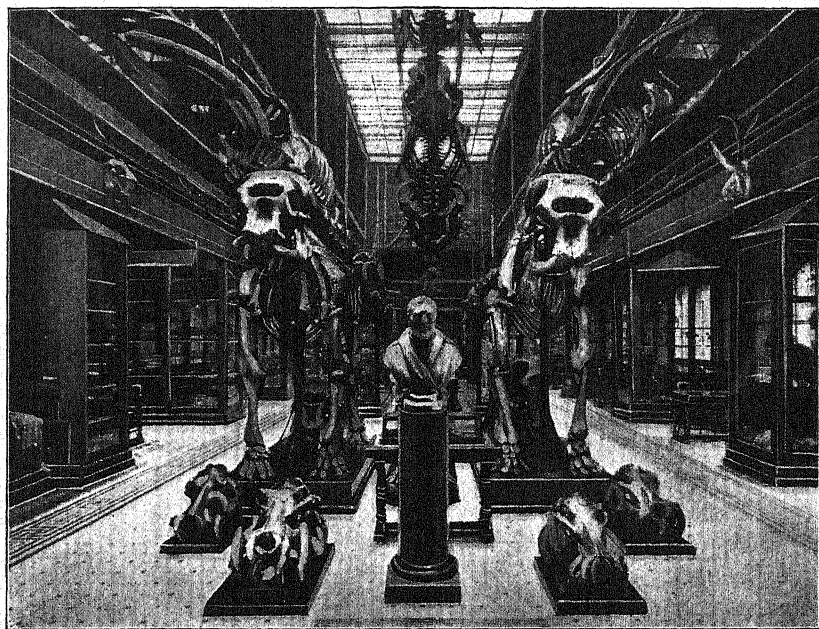


FIG. 91.—University of Edinburgh. Anatomical Museum.

of the Royal College of Surgeons in London (see p. 528), and was completed in 1885. It cost \$57,000, and, in addition, its interior installation (cases, etc.), cost \$42,000. It comprises a large hall, without columns, provided with a skylight, and two galleries, one above the other (fig. 91), its interior dimensions being approximately 37 meters long, 13 wide, and 14 high. The stairs to the galleries, one flight at each end, are narrow and steep, as in the Royal College of Surgeons in London; they are used only by students, for the great public visits the museum but little. The skylight consists of a horizontal layer of frosted glass panes, and above this a glass roof with a grating along the middle and inclined sides. The space between these two sets of windows is so

high that one can walk upright in it to clean the glass. The construction of this hall indicates in one respect an essential advance over the halls of the Royal College of Surgeons in London, which as already stated are too dark. Windows here are inserted on the ground floor, so that the galleries do not shade the hall below, as in London. The upper gallery has, besides, a floor of hammered glass. This scheme of supplemental side lighting is very essential where there are skylights, but is in no way to be preferred to the lighting of large halls from two long sides, as it has many disadvantages. For instance, the reflections of the skylight on the desk cases along the rail of the galleries is very annoying, as is true everywhere in similar structures (Hamburg, London, etc.). The cases on the galleries are shallow wall cases, and those of the hall itself are mostly free-standing ones, at right angles to the window piers. These are consequently excellently lighted, while, on the contrary, the wall cases on the narrow sides of the hall are dark. Though the superb mahogany cases, with plate glass, are on the whole very impressive when one enters the large hall, they do not, with their massive framework, answer to strict modern requirements. Furthermore, they do not close tightly, and the collection, therefore, must be cleaned yearly throughout. There are horizontal cases near the windows. The shelves in the cases are of plate glass or of iron lattice-work, which is less attractive. The museum contains on the main floor comparative-anatomy preparations. The upper gallery is devoted to pathology, as in the Royal College of Surgeons in London. Doors lead from the galleries into the several departments of the medical school. The floor of the hall is on the level with the adjoining laboratories, preparators' quarters, the dissecting room, and lecture hall. Everything is excellent and spacious. The ample space between the cases, from the floor to the roof, is occupied by a rich collection of whale skeletons, making a striking picture. They are suspended by chains, which appear less massive than the iron rods employed in the Royal College of Surgeons in London.

At one end of the great hall there is a room about 23 feet long, 16 feet broad, and 20 feet high, with a gallery for the excellent series of racial skulls; among them, for example, over 70 Australian skulls. This collection rivals in importance that of the Royal College of Surgeons in London. There is also an old phrenological collection, phrenology having been zealously cultivated in Edinburgh at the time of Gall.

In general, this museum, on account of the limited force of employees, as occurs in many English museums, is not sufficiently cared for or labeled. It ranks, however, among the best in the world, and Sir William Turner has made a worthy monument for himself.^a

^a Recently (1903) Sir William Turner has been elected principal of the University, and Prof. D. J. Cunningham of Dublin has become his successor.

29. MUSEUM OF SCIENCE AND ART.

The Museum of Science and Art (since 1904 the Royal Scottish Museum), which from its size and variety might properly have been mentioned before the Anatomical Museum, is an old one. It was founded toward the close of the seventeenth century, when the renowned naturalists, Andrew Balfour and Robert Sibbald, laid its foundation. Sibbald printed, as early as 1697, a catalogue of the collection of minerals, stones, metals, vegetable products, animals, art objects, manuscripts, and books. In 1854 the present location was purchased for \$35,000. In 1861 the new, stately building was begun after plans by Fowke. In 1866 the first portion, in 1875 the second portion, and in 1888 the last portion, was completed. It is the National Museum of Scotland, is supported by the state (Scottish Education Department), and is free of access to the university professors for

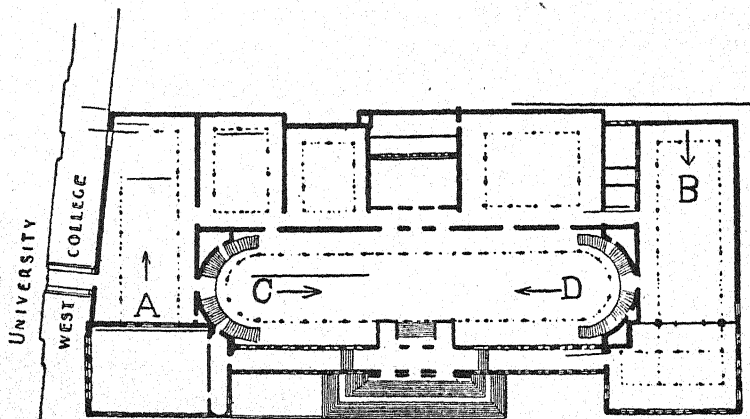


FIG. 92.—Museum of Science and Art, Edinburgh, Scotland. Plan of first floor.

purposes of instruction. The building immediately adjoins the new university, and opposite stands Heriot-Watt College, an institute for instruction in technology, natural science, and art. Now (since 1900) F. Grant Ogilvie is the director of the whole,^a and R. H. Traquair (since 1873) the curator of the natural science department. There are 30 officials on its roster. In the manner of the South Kensington Museum, in London, it combines art, industry, and technology, and in addition, the entire natural sciences, making a grand whole. It is divided into the following departments:

1. *Decorative art*: Specimens of ancient, classic, mediæval, and renaissance sculptures, especially as applied to architecture; the indus-

^a Recently (1903) Mr. Ogilvie became principal assistant secretary of the board of education in London, and was succeeded by Prof. J. J. Dobbie as director in Edinburgh.

trial art of Europe from ancient to modern times, ethnographical collections, Persian and Indian collections, Chinese and Japanese collections, ancient Egyptian and Chaldean arts, furniture and decorative woodwork, casts of architectural ornament.



FIG. 93.—Museum of Science and Art, Edinburgh. West hall (engineering section).

The museum is free on five days of the week from 10 a. m. to 4 p. m., Saturdays from 10 a. m. to 10 p. m., Wednesdays also from 6 to 10 p. m., Sundays from 2 to 5 p. m., on which account a large portion

of the collection must naturally suffer. The building consists of a spacious hall with skylight and two galleries—one above the other (figs. 95 and 96) and with ten large adjoining rooms partially supplied with skylights and galleries. It measures in exterior 433 feet long and 206 feet wide, and has 122,000 square feet of exhibition floor space. It is in some parts insufficiently lighted and has the defects of similar buildings. The

cases are of wood with clumsy framework, and are black. To make them dust proof, velvet strips have been placed between the frames and the doors, but without grooves, and then the doors are screwed on to the outer framework; besides being locked up at several places.

2. *Technology*: Mineral, animal, and vegetable, chemical products and manufactures; economic botany.

3. *Engineering*: Civil engineering, mechanical engineering, models of ships and marine engines, guns and gunnery.

4. *Natural history*: Zoology, geology, mineralogy (geology and minerals of Scotland separately represented).

5. *The library*: Over 12,000 volumes; patents.



FIG. 94.—Museum of Science and Art, Edinburgh. East hall (natural history).

To open them, one must get a ladder, and then with a screw-driver unscrew them in several places. No attention is paid to this inconvenience, however, since they are not accustomed to anything better, and they even regard this method of installation as an advance on that of other museums, since it prevents the warping of the wooden framework and makes the cases dust proof, which it evidently does when the frames are screwed on. Notwithstanding all this, the cases and doors are quite small. Three hundred and fifty running feet of such cases were completed and installed in 1899 alone.

The labeling of the Department of Art and Industry is after the pattern of that of the South Kensington Museum. In the great Natural History Department, which is by no means insignificant and which fills four great skylighted halls and six galleries (3 series of two galleries, one above the other), I did not notice any features deviating from the



FIG. 95.—Museum of Science and Art, Edinburgh (art).



FIG. 96.—Museum of Science and Art, Edinburgh (art).

customary ones. Throughout the museum there is by far too much exhibited for the great public, and, in consequence, this not only tires the visitor, but the exhibits are damaged seriously by being constantly exposed to the light. This matter is sufficiently considered in but few museums of the world.

But I can not properly do justice to these large and extensive collections in a brief space. I found

nothing that was directly worth imitating or particularly useful in planning for a new structure. The ventilation was primitive and the building was not adequately fireproof.

A not unimportant ethnographic collection of over 10,000 specimens is remarkable, with more than one valuable old specimen; Benin

bronzes, too, are represented. The order and labeling was not satisfactory, but a new installation was just going on.

The museum contains also loan collections from the South Kensington Museum in London. It was visited in 1901 by 375,179 persons, half of whom attended during the evening.^a The opening of the museum on Sundays begun only with April 1, 1901, and, on account of its departure from custom, aroused much opposition; but Sunday opening has since been introduced in Glasgow. The average attendance on Sundays up to the present time has been 1,297 persons^b (in London, 8,500; in Dublin, 5,000, in the corresponding museums). In 1897-98 the annual expenditure exceeded \$75,000.

30. NATIONAL MUSEUM OF ANTIQUITIES.

The National Museum of Antiquities was founded in 1780 and has belonged to the nation since 1851. The new building, by R. Rowland Anderson, costing \$250,000 and very notable and attractive in its exterior, was completed in 1890 and was a gift from John Ritchie Findlay. It is in the comparatively broad Queen street, in close proximity to other houses. It is built in the Gothic style, not adapted for housing collections, and in parts is insufficiently lighted. The director, Dr. Joseph Anderson, himself regrets this, as well as the many other defects of the building. I mention it only for the purpose of calling attention to the fact that museum buildings are almost universally badly planned, because the architects do not seek, as they should, the advice of experts. Unfortunately there are but few experts in such matters.

The building is of brick, which is treated on the interior somewhat too roughly to be attractive. Light is obtained from both long sides, but the Gothic windows admit too little. It is fireproof; without proper ventilation; and heated by steam. The collection of antiquities occupies the right wing of the building; the left contains the national portrait gallery and a collection of casts and other objects relating to art. The center of the building is occupied by a large entrance hall (with paintings), which takes up much room. The Museum of Antiquities consists of a very comprehensive, valuable, and attractive prehistoric and historic local (Scotch) collection, excellently arranged in chronological order. The upright and horizontal cases are primitive. The interior furniture cost \$20,000. There is a considerable library in a hall, lighted from above; also a small ethnographic collection, with valuable objects from the South Seas, some of which are old. The building is open daily from 10 to 4; on two days of the week

^a During 1902 there were 441,370 visitors, 148,796 of whom came during the evening.

^b During 1902: 1,501, together with 78,027; 1,165 on week days—together, 214,547.

there is an admission fee of six pence; it is closed on Mondays. The number of visitors yearly is about 20,000. A most excellent handbook is the catalogue of the National Museum of Antiquities of Scotland, 1892 (1 shilling), 380 pages, 752 illustrations. An annual report is published in the Proceedings of the Society of Antiquities of Scotland. The museum has not sufficient means at its disposal.

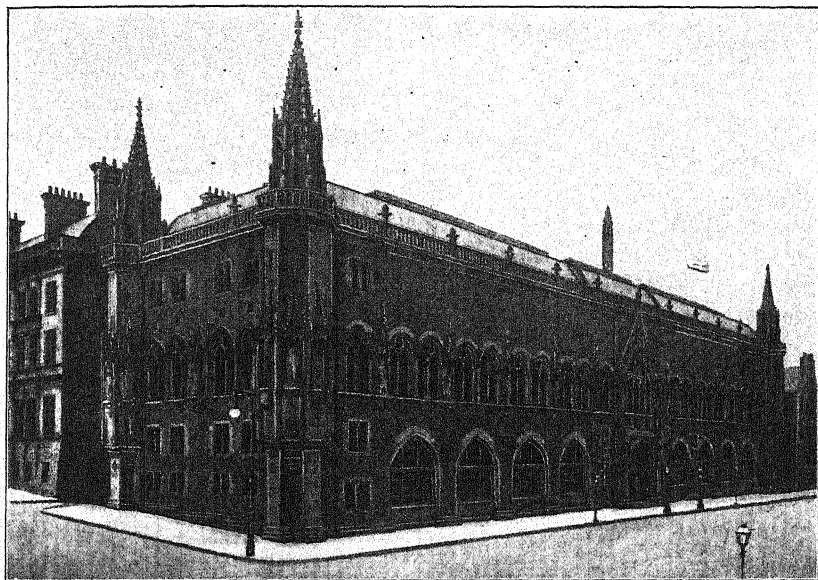


FIG. 97.—National Museum of Antiquities, Edinburgh, Scotland.

31. VARIOUS OTHER MUSEUMS.

I mention, in addition, the National Gallery, with a considerable collection of paintings, poorly lighted from above; the Royal Institution, with a collection of casts; the City Museum; the Fine Art Museum, in the university; and the Museum of the Royal College of Surgeons. These establishments, excepting the first named, I omitted to visit, for I was told that they were not important and, moreover, other sights of interest in Edinburgh completely occupied my time. I beg to mention in closing, however, the magnificent Botanical Garden, with its splendid conservatories, containing, among other things, a collection of pitcher-plants (*Nepenthaceæ*), of surprising beauty and abundance.

The administration of the Edinburgh museums will undoubtedly receive a great impulse from the gift of Andrew Carnegie (born in Scotland in 1837 and emigrated in 1848, with his family, to America), who donated \$10,000,000 to the Scotch universities (as a first installment) for the "advancement of education," a portion of which dona-

tion may be devoted to the promotion of scientific research through the establishment and equipment of museums.^a

X.—GLASGOW.

Glasgow is a seaport and manufacturing city, with upward of 1,000,000 inhabitants. Its street life is imposing; it is not so begrimed as Manchester, but still it is smoky to a very considerable extent. In Kelvingrove Park stands the great university building erected in 1870, by G. G. Scott, at a cost of \$2,500,000 (the university was founded in 1451), in the early English style with later Scotch-Flemish features. The building is 590 feet long and 321 feet wide, with a tower 328 feet high. The library contains 180,000 volumes, and there are 2,500 students and 60 instructors. The annual expenditure for the university is \$300,000. Inasmuch as I was informed that its collections are not very noteworthy, I did not inspect them, especially since the international exhibition in the same park fully occupied my time. My chief interest lay in the entirely new Museum of Art and Science, opened in 1901, and temporarily occupied by parts of the exhibition.

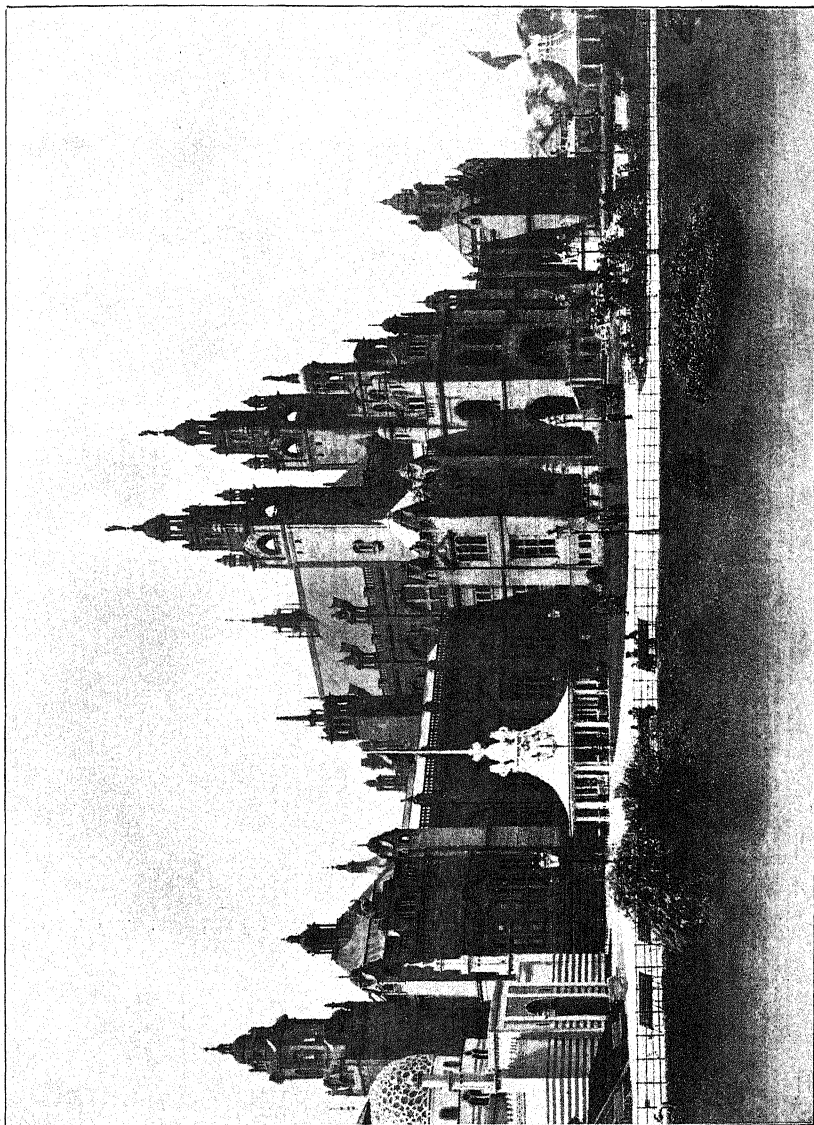
32. CORPORATION MUSEUMS AND ART GALLERIES.^b

During the exhibition the building contained mostly loan collections, but at its close the not unimportant gallery of paintings, the Corporation Art Industrial Museum, and the Natural History Museum were installed there.^c This natural-history collection at the time of my

^a Andrew Carnegie earned at the age of 12 years \$1.25 a week as spooler in a cotton factory; then he became fireman in a factory; then telegraph messenger; in his fifteenth year a telegraph operator, with a salary of \$25 a month. At the age of 20 he became secretary to the director of a large railway; at 25, a superintendent of military telegraphy of the Federal Government; at 28, the owner of an oil well; at 30, a builder of iron bridges; at 45, the "steel king." It is said that he possesses a fortune of \$300,000,000, but has determined to give away his entire property in order to die "poor." He spends his summer in Skibo, Scotland. (See further mention of Mr. Carnegie and his gifts on previous pages.)

^b It is noticed that it is intended to change the name to Art Palace. We also find it styled in various ways—as, Corporation Art Gallery and Museums, New Art Galleries and Museum, Corporation of Glasgow, Museums and Art Galleries, Glasgow Art Gallery and Museum (Kelvingrove), Corporation Galleries, etc. The former Kelvingrove Museum had the following divisions: Fine-art section, ethnographical section, archeological section, technological section, local-history section, natural-history section, and book section.

^c I have indicated on the plan of the ground floor (fig. 98) the present distribution of the collections. In the second story there are only paintings and art objects (see *The Museums Journal*, I, 1902, p. 317). The director expresses his regret (on page 324) that the natural sciences are not properly cared for, the very limited space affording no opportunity for a strictly systematic arrangement and being cut up too much. It is certainly unfortunate that in an entirely new building these difficulties must already be encountered.



CORPORATION MUSEUMS AND ART GALLERIES.
Glasgow, Scotland.

visit was, for the purpose of preparation, partly stored in the cellar of the new museum, so that I saw little or nothing of it. Earlier years are covered by the Annual Reports: Corporation of Glasgow (parks

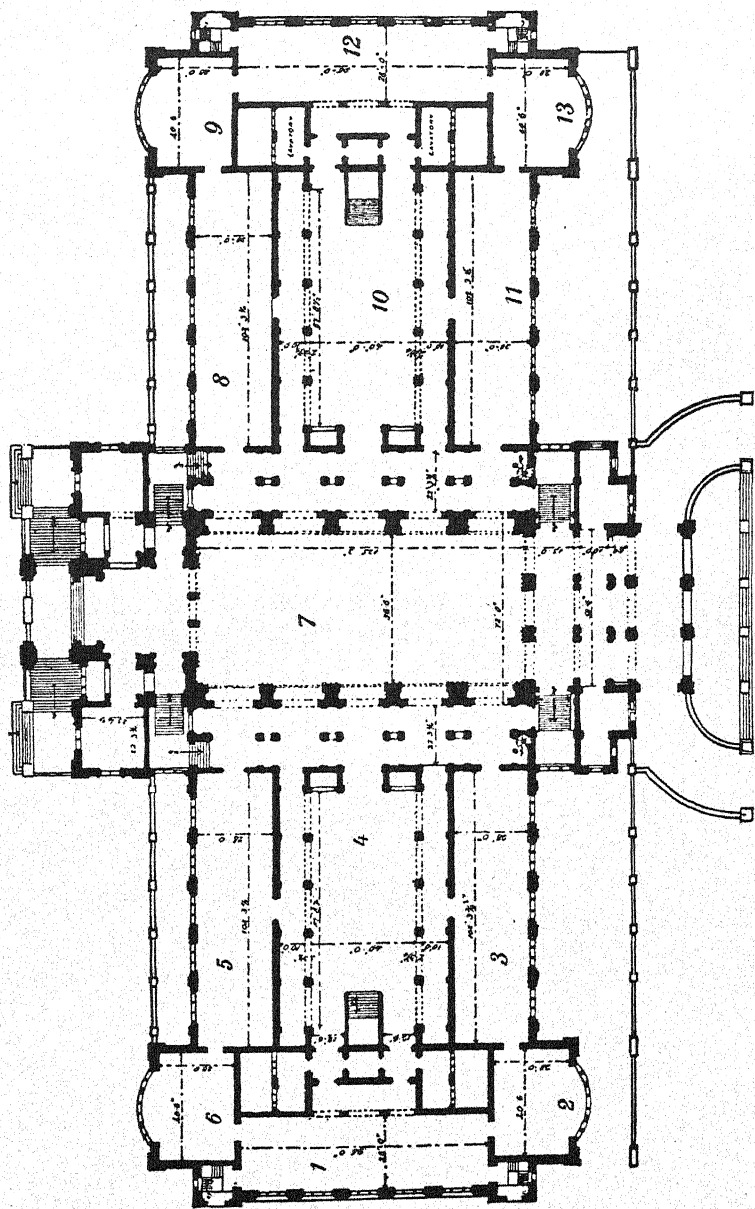


FIG. 98.—Corporation Museums and Art Galleries, Glasgow, Scotland. Plan of first floor. 1-3 technology, 4 naval architecture and engineering, 5 archeology, 6 local antiquities, 7 sculpture, 8-10 zoology, 11 geology, 12-13 ethnology.

department); museums and galleries. For example, report for the year 1899, 16 pages. The Natural History Museum was visited in 1899 by 232,000 persons.

The director of the whole is now J. Paton and the curator of natural-history section is J. M. Campbell, in connection with which section an entomologist is employed as an assistant. The superintendent

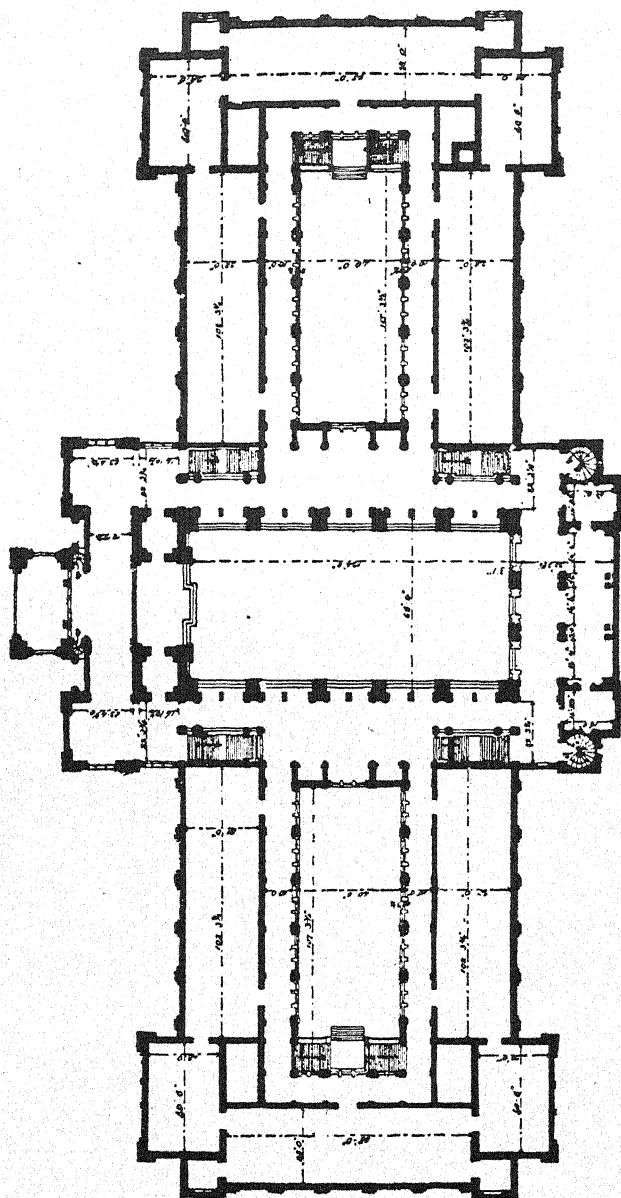


FIG. 99.—Corporation Museums and Art Galleries, Glasgow, Scotland. Plan of second floor. The right wing is used for modern pictures, the left wing for the old masters, and the center for art in general.

of the building, who gave me the most detailed information concerning the new structure, and to whom I am therefore particularly indebted, is H. Cornish.

The new building (Plate 39), by J. W. Simpson and E. I. M. Allen (of London), begun in 1893, is decidedly cumbrous^a though effective in its exterior. In the interior it is also richly decorated, but not too much for its purpose. It is of red sandstone in the French Renaissance style, and is fireproof. The chief artistic decoration is by G. Frampton. Sir Walter Armstrong, director of the National Gallery in Dublin, sharply criticised^b the selection of red sandstone instead of white, since the red stone, on account of the smokiness of Glasgow, will soon become completely black. The architect of the John Rylands Library in Manchester (see p. 548), on the contrary, maintains that the red sandstone withstands the effects of the smoke better than the white stone. I believe that the difference, if any, is scarcely perceptible. It would be a blessing if all of these cities were less smoky. The building is approximately 492 feet long and 164 to 278 feet wide. It has a stately main hall with galleries 137 feet long, 62 feet wide, and 88 feet high, of cream-colored sandstone; and two lateral halls with skylight and galleries 110 by 65 feet. The six lateral and intersecting halls of the ground floor are lighted from the side; the six of the second story from skylights. They are (approximately) 110 feet long and 30 feet wide; those of the second story occupied by the art gallery, in the opinion of Sir Walter Armstrong (see above), are too low. There are four corner pavilions in each story, the upper ones with skylights, making the ground plan quite diversified. Six stairways lead to the second story. Above the southern front hall there is another large hall in the third story. The lighting arrangements are good, with brilliant electric illumination in the evenings. The many towers, some of which are 186 feet high, are useless, and constitute a very questionable ornamentation to the building, since it lacks repose. The proceeds of the Glasgow Exhibition of 1888 (nearly \$250,000) was the basis of the funds from which the cost of the building was defrayed. To this were added voluntary donations (almost \$375,000), and this sum not being deemed sufficient, the city undertook the construction of the building, which cost over \$1,250,000. The proceeds of the Exhibition of 1901 (\$500,000) will be devoted to the purchase of pictures.

I would have little reason to dwell longer on this new museum, which is only a more or less slight departure from the usual pattern,^c

^a Plate 39 was taken during the Exposition, for which reason we see various kiosks, pavilions, etc., which do not belong to it.

^b *Scots Pictorial*, June 15, 1901, p. 181.

^c Sir Walter Armstrong characterizes the ground floor of the building "more successful than anything else of the same kind in Europe." I grant that it is magnificent, but I doubt if it deserves so great a commendation. He remarks at the close of his paper: The Glasgow Gallery is incontestably the finest in Europe outside the great capitals, and the director, J. Paton (the *Museums Journal*, January, 1902, p. 315), goes so far as to say: Glasgow can boast of having the most handsome and architecturally ornate museum building of any provincial town in the United Kingdom if not in the whole world.

were it not for the fact that it has one arrangement which in museum buildings marks an advance of the greatest importance, namely, that for ventilation. It is like that described above in the technical school and the Rylands Library in Manchester, and which I also observed in

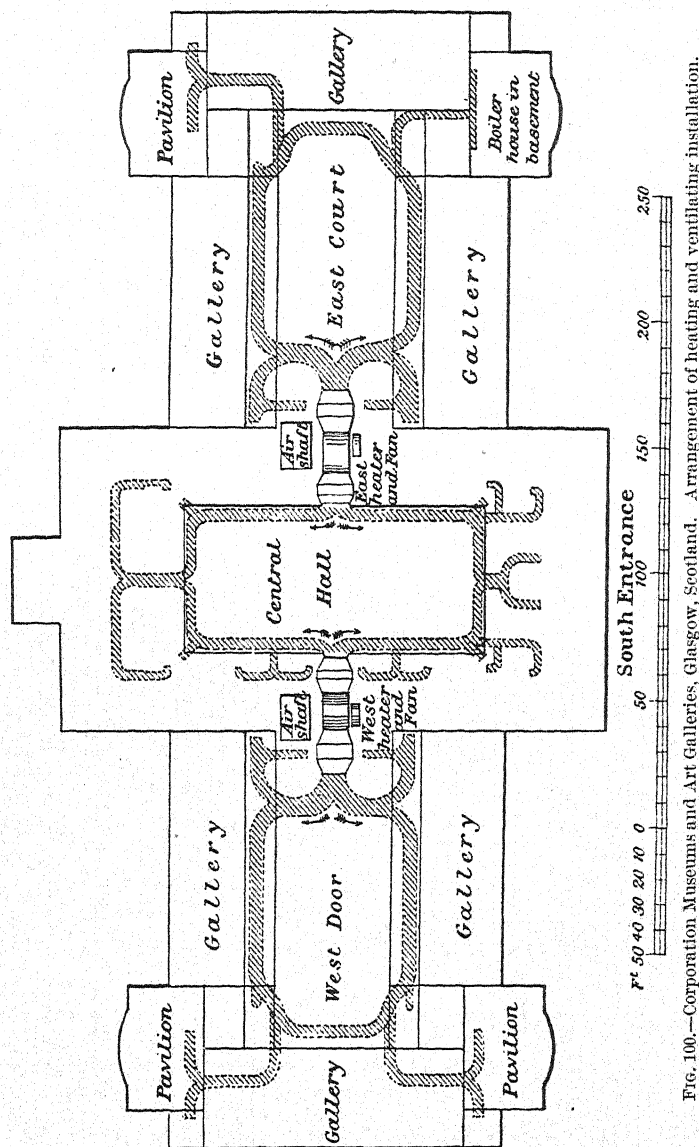


FIG. 100.—Corporation Museums and Art Galleries, Glasgow, Scotland. Arrangement of heating and ventilating installation.

American libraries. Here in Glasgow, however, the scheme has first been applied within my knowledge for museum purposes, at the same time as we shall see with that of the museum in Liverpool. I mark, with the erection of this building, a new epoch in the history of

been installed with securely closed windows. It will, however, be discarded, since in modeling so much dust is stirred up inside that it is thought that the dust from without could not be objectionable.

I should not think it proper, however, to discard the system merely for this reason.

The installation of the ventilating apparatus is shown in figs. 100-102. It cost \$40,000, without taking into account the masons' work on the boilers and stacks, and was set up by the Sturtevant Engineering Company (Limited) from designs by Engineer Thomas Young, of Glasgow, based on the plenum system. A detailed description of the diagrams shown in the illustration may be found in *The Engineer* of September 20, 1901, p. 312. The outer air is drawn in at the top of a large tower, 10 by 6½ feet in cross section, filtered, washed, warmed, and then forced into the rooms by means of electric fans. These fans make 120 revolutions a minute and convey 5,000,000 cubic feet of air an hour into the building. The air that has

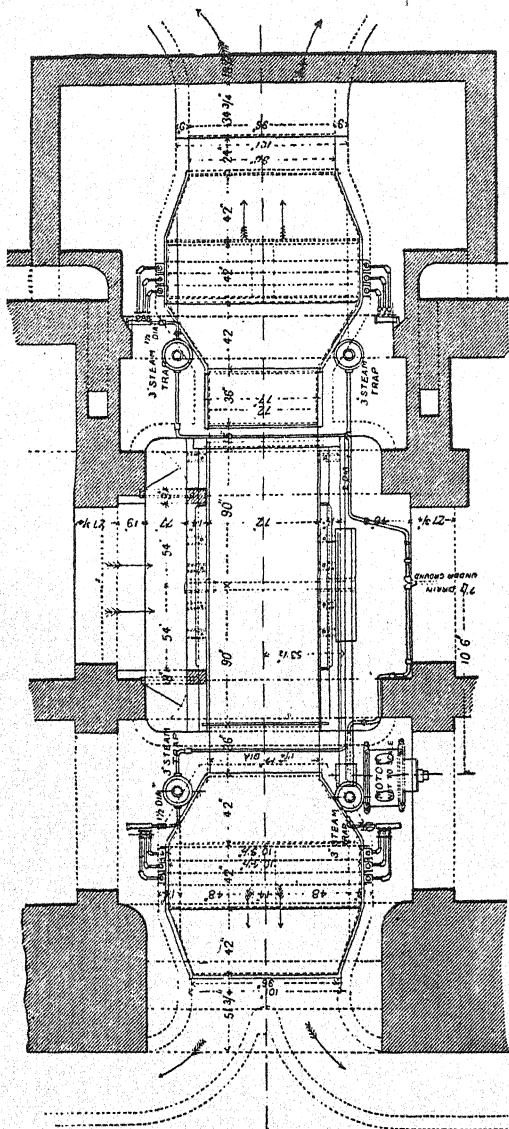


FIG. 102.—Corporation Museums and Art Galleries, Glasgow, Scotland. Arrangement of heating and ventilating installation.

been used is drawn out through conduits near the floor, which lead out above the roof. The entire arrangement has proved most satisfactory up to the present time.^a

^a I inquired recently as to the efficiency of the heating and ventilation after two years' experience, and Mr. Cornish favored me with the following reply, dated

33. TECHNICAL COLLEGE; MITCHELL LIBRARY.

The great city of Glasgow, which enjoys the best government of any of the cities of the Island Kingdom, would certainly, on closer study, have offered many other things worthy of examination in relation to museum matters, but my time was too limited.

I shall mention, in addition, the Glasgow and West of Scotland Technical College, founded in 1886, with an annual expenditure of \$100,000, 600 day and 4,000 evening pupils, 67 instructors, and a library of 15,000 volumes; also the Mitchell Library, established in 1877, with an endowment of \$350,000 by Stephen Mitchell, an annual expenditure of \$16,500, and 145,000 volumes. There are probably 500,000 volumes annually consulted, for the library allows no books to be carried away. The daily attendance is approximately 2,000. To prevent a conflagration from flying sparks tubes are laid upon the roof with small apertures through which, upon the opening of a cock in the cellar, sufficient water flows to extinguish any fire. This is an arrangement very worthy of imitation. (See, concerning this excellent library, J. J. Ogle, *The Free Library*, 1897, pp. 288-293; and F. J. Burgoyne, *Library Construction*, 1897, pp. 162-166.)

XI.—LIVERPOOL.

Liverpool is a seaport and manufacturing town of nearly 700,000 inhabitants; somewhat hilly, and not as highly smoked up as Manchester, but also black. For this reason the good effect of the very impressive principal square is injured. It is similar to the forum of a Roman city, with St. George's Hall, a building like a Greco-Roman temple, 650 feet long and 200 feet wide, for public assemblages, concerts, etc., built in 1838-1854, at a cost of \$1,500,000; a row of monuments, and a long, extending group of museum buildings in the Greek style. Outside of these Liverpool possesses very little of value for my purposes. It has a university college, which is a portion of Victoria University, as mentioned previously (see paragraph on Owens College, in Manchester), with from 500 to 600 students and over 100 instructors. There is also an observatory.

Glasgow, November 24, 1903: I am glad to say the heating and ventilation is giving very good results and I do not think one can at present get a better or cheaper system to do the work required. One alteration I have made is that in place of washing the air at the screens I have put up scrim screens and filter the air through the cloth and so do away with the water, which was causing dampness in the buildings and doing harm to the old paintings and other objects. When one considers that our large buildings can be kept at about 60° in the winter months by a daily supply of 7 tons of washed pearls 'screened dross,' costing at present, 7s. 1d. per ton, you will see that the system used is cheap as well as efficient. I may say the floor space of our building is as follows: Picture galleries, 21,450 square feet; museum galleries, 21,336 square feet; central hall, courts, and corridors, which are marble, 45,000 square feet; grand total of floor space, 87,786 square feet.

34. LIBRARY, MUSEUM, AND ART COMMITTEE.

The collection of buildings of the museums of art and science are maintained by the city at an expense of \$200,000 and are administered under the "Library, museum, and art committee." They comprise the following departments: (1) An art museum (Walker Fine Art Gallery), built in 1877, on the ground floor of which are plastic reproductions, on the second floor paintings, excellently lighted and pleasantly set off by tapestries and plants, so that a sojourn there is highly agreeable. (2) A library (Picton Reading Room) of 122,000 volumes exclusive of pamphlets, a reference library, principally contained in a great round building. (3) The main structure, called the "Free Public Library and Museums," a library of 95,000 volumes, with five branches in the city, for lending books, with reading and periodical rooms into which people pour from the streets, "and a museum of natural science, archeology, ethnography, industrial arts, and art (independent of those branches of art which the Walker Fine Art Gallery cultivates), known as the "Free Public Museums." In the lower stories of this museum building is located the new technical school.

35. FREE PUBLIC MUSEUMS.

The Free Public Museums are open on five week days from 10 a. m. to 4 or 6 p. m., and in the winter, on Monday evenings, from 7 to 10 p. m. In 1899, on 262 days, there were over 300,000 visitors; in 1898, on 264 days, over 350,000. At 12 public lectures on Monday even-

"I did not carefully inspect these libraries, founded in 1852, since their arrangements are not modern. Their sphere of action, however, is great. The totals for 1900 are as follows: 666,207 books and 728,128 periodicals were read in the library; 612,386 persons visited the newspaper rooms, and 58,929 the 116 public lectures; 819,317 books were carried home by 22,244 persons ("for the most part they belong to the working classes, and to persons of education but of very limited means"), of which, however, 643,842 were fiction and 132,535 were children's books. Although I particularly mention the fiction included in this total, I do not wish to depreciate the value of such books, for after the day's work there are few recreations so refreshing, delightful, and even instructive to the thoughtful reader as is fiction, while we should not overlook the fact also that the public libraries do not purchase any bad novels. In the Picton Reading Room alone, where no fiction is given out, 246,533 books were read, of which there were, for example, 41,863 technical, 49,748 collected writings, essays, etc., and 22,145 historical and biographical. The library possesses 15,913 technical, 29,042 collected writings, essays, etc., 14,595 historical and biographical works. (Forty-eighth Annual Report Public Libraries, etc., Liverpool, 1901, pp. 5-31; see also J. J. Ogle, *The Free Library*, 1897, pp. 165-173, and F. J. Burgoyne, *Library Construction*, 1897, pp. 167-170.) It is open on week days from 10 a. m. to 10 p. m. (Fridays from 10 a. m. to 2 p. m.). The annual expenditures are \$100,000, half of which is expended for books, periodicals, and newspapers. About 80 persons are employed. The reference department has a catalogue in three volumes in quarto, 2,066 pages. In Germany we are very backward in this respect, though we far excel the English in the busy life at our hedge taverns.

ings, from January to March in 1900, there were 760 auditors, in 1899 at 21 lectures, 2,470. The museum consists of two great collections: The Derby Museum of Zoology, Botany, Geology, Mineralogy (also an aquarium), which has as its nucleus the mammal and bird collection of the thirteenth Earl of Derby, who presented it to the city in 1851; and the Mayer Museum, covering the other departments mentioned. Joseph Mayer was a rich goldsmith of Liverpool, who in 1867 presented to the city his most valuable collection, consisting especially of pottery, Assyrian, Babylonian, Egyptian, Greek, and mediæval antiquities and manuscripts. I mention as most noteworthy the carved ivories, the collection of Anglo-Saxon antiquities, the Mexican Codex,^a the miniatures, and the great Wedgwood and old

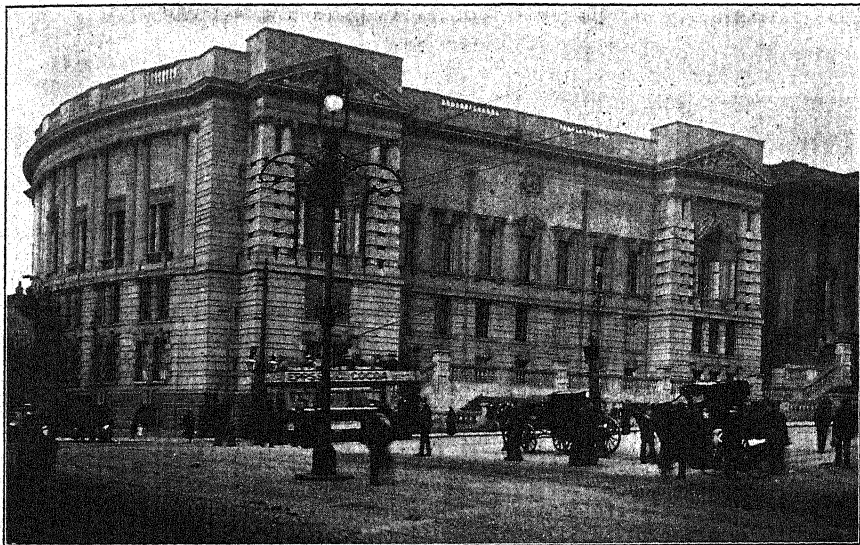


FIG. 103.—City Technical School and Free Public Museums, Liverpool, England.

Liverpool ceramic collection. In 1860 Sir William Brown presented the present building to the city. At the end of 1897, the space having become too limited, a great wing was added (fig. 103), containing two floors (figs. 106 and 107), each with a single connecting room 36 feet wide, undivided, horseshoe-shaped, 460 feet long, surrounding a courtyard. The lower floor, 20 feet high, is lighted on both sides; the upper, 30 feet high, with a skylight. As fig. 103 shows, the land falls away somewhat. What I have indicated as the lower floor of

^a This Codex has only recently been published: E. Seler *Codex Fejérváry-Mayer*. Eine altmexikanische Bilderhandschrift der Free Public Museums in Liverpool, Berlin, 1901, 4to, 230 pp., 22 pls., 219 text figures; and: Duc de Loubat, *Codex Fejérváry-Mayer*. Manuscrit mexicain précolombien des Free Public Museums de Liverpool. Paris, 1901, 8vo, 28 pp., 2 pls.

the Natural History Museum is the third of the building, since the three below that (the basement, ground floor, and second floor) belong to the new Technical School, which is entirely separated from it and has its own entrance. The lower floor of the Natural History Museum (the third in the new wing) is, however, on a level with the ground floor of the old museum, with which it makes a complete whole (fig. 103). The height of the new wing is 100 feet above the street level. It is hard stone, constructed by E. W. Mountford, in the "modern classic style of the nineteenth century;" it is 206 feet long and 177 feet wide, and has an area of 3,000 square yards. Between the seven windows of the lower museum story on the rounded portion are pairs of Ionic columns 33 feet high. Also, high up above the upper story of the museum are additional rooms for the Technical School, namely, a chemical laboratory and an observatory. The school has 1,300 students. The entire new building cost \$675,000, of which \$375,000 falls upon the museum. The new large rooms are completed (figs. 106 and 107), and, being excellently lighted and spacious, the museum will, next to that of London, be the most comprehensive, and in all respects one of the best in Great Britain.^a The lighting of the gallery on both sides, 36 feet wide, is faultless, and the only method suitable for a natural-history museum, since in that way wall cases placed opposite the light are avoided. The upper story could not be lighted in this manner, but it was necessary to depend upon a skylight, as the new wing had to correspond constructively with the exterior of the old museum. Here, likewise, the adaptability of the interior has been subordinated to exterior beauty. The skylight is not by any means bad, though side light would have been better. Besides, the handling of a large skylight is somewhat inconvenient, and it can

^a In the Report of the Director of Museums relative to the Rearrangements of, and the Cases for, the Collections in the Free Public Museums (Liverpool, 1901, 8 vo., 16 pp.), Prof. H. O. Forbes develops the fundamental features of his plan of installation. The future collections will consist of: I. The Aquarium; II. The Mayer Museum, that is subdivided into three great ethnographical divisions, in the Caucasian (white), the Mongolian (yellow), and the Melanic (black) races; III. The Lord Derby Museum, the latter being subdivided as follows: Types of the Principal Groups and Subdivisions of the Animal Kingdom, from mankind down to unicellular forms. This biological collection begins with an introductory series of animals, plants, models, and drawings, illustrating the distinction between inorganic and organic objects, between plants and animals, as well as the general formation and the physiology of animals. Associated with the living forms will be the fossil ones, so that by studying them together the development from the first to the last may be observed. Then will follow the mineralogical and the geological collections. Beyond this a representation of the geographic distribution of animals and plants, as well as of protective mimicry, variation of species, and other fundamental principles of biology. Finally, a collection of objects by countries not confined to too narrow geographical boundaries, but including the adjacent waters, will aim to be practically complete. Botany will be put in advance of everything else in a British collection, but typical examples of all natural orders will also be given.

never be kept clean. The electric illumination employed at night consists of arc lights reflected from the ceilings, of which a test was being made at the very time of my visit. It resulted successfully, even in the skylight floor. The iron cases for the collection will soon be completed. There is allotted for the interior furnishing \$125,000 (the interior arrangements of the Technical School cost \$75,000).

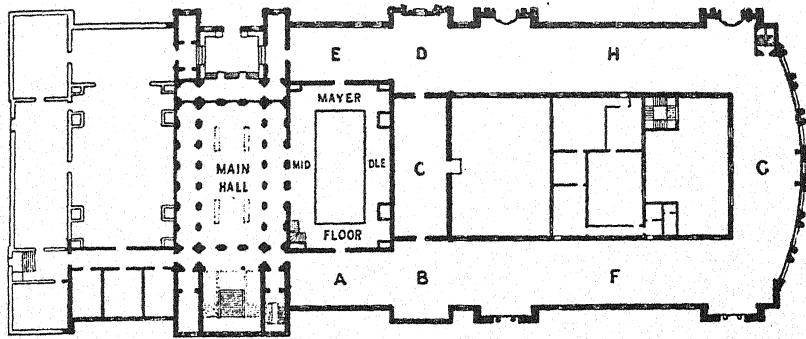


FIG. 104.—Free Public Museums, Liverpool, England. Plan of lower floor.

The present portion of the old Museum must be less favorably spoken of. The rooms are too dark; one with a skylight and galleries suffers much from reflections on the broad desk cases arranged along the rail. The vertical and horizontal cases are some of them very clumsy. I observed, however, a good arrangement upon horizontal cases, namely, a brass mounting on the anterior framework, on which the observer can lean while examining the objects in the case. The

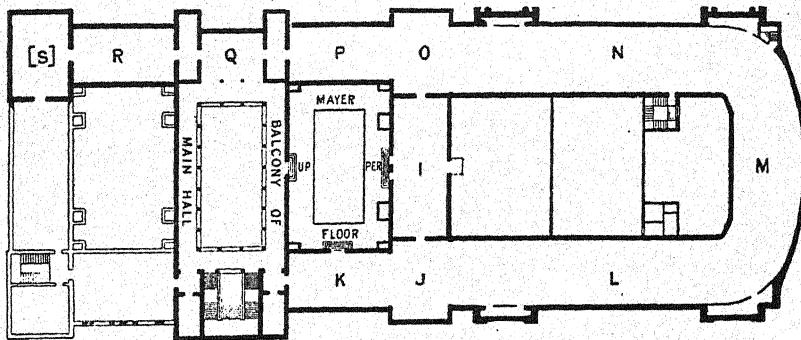


FIG. 105.—Free Public Museums, Liverpool, England. Plan of upper floor.

collection, owing to the rebuilding, is not well cared for at present; it is also overcrowded, but contains much valuable material. The new installation of the entire Museum will work great changes in this respect. This Museum suffers, like others, from a lack of a sufficient corps of assistants. The newly installed anthropological hall is exceptionally fine in its clear arrangement and the choice of its

objects. It contains, for example, life-size photographs of the heads of different races, enlarged from smaller negatives. The ethnographic collection, now temporarily installed in the basement is very considerable, containing many old specimens and also a good representation of Benin bronzes. The noted ornithological collection is rich in types, and contains among other things the famous collection of the ornithologist, H. B. Tristram.

The principal reason why I dwell longer on this Museum, though its importance is of the future rather than of the present, is because in one respect, together with that of Glasgow, it excels all other museums of the earth, and that is as regards the new ventilating and heating



FIG. 106.—Free Public Museums, Liverpool. One of the longitudinal galleries of the upper floor in new building ("L" in fig. 105).

installation. When the large new wing for the technical school and the museum was designed, not only that, but also the old museum, the library, and the art gallery, were supplied with the ventilating and heating contrivance described in connection with the Glasgow Museum. Engineer W. Key, of Glasgow, superintended the installation of this in Liverpool. There are four and a third miles of 3-inch tubes, which carry purified and warmed air into each room at the rate of 8,000,000 cubic feet an hour. The ducts through which the purified, washed, and warmed air streams into the tubes, are so large that one can easily walk in them. The power is supplied by great dynamo machines. The future must demonstrate whether, being located in

the same building, these will not damage it by causing vibration. This has very generally been avoided in America. I am not favorably disposed to the combining of a technical school and its many laboratories in the same building with a museum. The windows of the building can not be opened, and the collection has the rare advantage in that no dust is brought in with the air to damage them; neither does any come in through the doors, since the pressure of air on the interior is somewhat greater than that from without. This system of ventilation is known as Key's improved plenum method. It was a surprise to me that the authorities in the Liverpool, as well as in the Glasgow Museum, did not know that this same installation existed in the other



FIG. 107.—Free Public Museums, Liverpool. One of the longitudinal galleries of the lower floor in new building ("F" in fig. 104).

museum. I repeat that the two museums of Great Britain which I have mentioned excel in this respect all museums of the world, and I earnestly recommend that we adopt this arrangement and do not remain in the background. The Liverpool Museum appears to have reached this in connection with the construction of the technical school, while that of the museum in Glasgow was carried out independently.

I notice in a printed letter of the firm of William Key (works for ventilating and warming by mechanical means, Havelock street, Glasgow) that such installations have already been introduced into a great number of schools, hospitals, factories, hotels, private dwellings,

municipal buildings, etc., in England and Scotland, and that it is also installed in the university and the public library in Aberdeen. The Key list enumerates more than 80 buildings. Great Britain has probably outrivaled America in this respect, at least I found this installation only in two large buildings in Chicago (see the second part of my American studies) and in one in Washington. In the pamphlet published in connection with the opening of the New Central Municipal School in Liverpool on October 26, 1901,^a the ventilating and heating arrangements are referred to as follows:

The air in the building is kept under a pressure slightly greater than that of the outside atmosphere. The air is taken in from the large area at the back of the building, and after being washed and filtered by passing through wet fiber screens, and warmed when necessary by means of a large surface of coils of pipes heated by steam, it is propelled by four large fans into the main ducts in the subbasement and then by subsidiary ducts to each room in the building. The air is admitted to the rooms at a height of about 6 feet from the floor, and escapes at the floor level into the foul air ducts which lead to the outside through apertures protected by valves. (The electric power is supplied by the city works).^b

From 1877 to 1891, the museum published, at irregular intervals, five Museum Reports relating to scientific subjects; since 1898 a Bulletin of the Liverpool Museums, in octavo, with plates,—a well-edited publication, of which three volumes have appeared; in addition, Annual Reports, of which the forty-eighth, for 1900, has been published (37 pp.); guide books, such as Synopsis of an arrangement of invertebrate animals in the Free Public Museum of Liverpool, 1880 (32 and 105 pp.); catalogues, such as Catalogue of the Mayer collection: Part I, The Egyptian, Babylonian, and Assyrian Antiquities, 1879, ix, 83 pp., with illustrations; Part II, Prehistoric Antiquities and Ethnology, 1882, xiv, 106 pp., with illustrations; Part III,

^aSir William Forwood, chairman of the "Library, Museum and Arts Committee" of the city council, on the occasion of the laying of the corner stone on July 1, 1898, said among other things: "This building is intended for the higher technical education—for educating the captains of labor, and not merely the artisans, in a way that would enable them to meet the competition of Germany. The Germans have had these superior schools for years, and have been turning out a large number of expert and scientific men such as did not exist in England." As in the great Technical School in Manchester, so also in Liverpool, they are striving to compete with Germany in technical matters.

^bI inquired recently as to the efficiency of the heating and ventilation after two years experience, and Mr. Forbes, the director, favored me with the following reply, dated Liverpool Nov. 28, 1903: "In regard to the heating and ventilating system of the museums I am sorry to report not quite favorably. This, however, is not the fault of the system of Key, which, by the way, has been further perfected, but by reason of the intake aperture for the fresh air having of necessity, and unfortunately, to be placed in a 'well' (surrounded by walls 70 to 80 feet high), with which the air from the galleries is discharged and necessarily so constantly being redriven into the Museum. We are thinking of changing the 'intake' openings—a costly procedure—and when this is done, I believe all we can desire would be attained."

Mediæval and Later Antiquities, including the Mather collection of miniatures and medals relating to the Bonaparte family, 1882, iv, 108 pp., with illustrations (sixpence for each part). I call attention also to the valuable writings of a former director of the museum, H. H. Higgins, *Museums of Natural History*: (1) *Museum Visitors*, (2) *Museum Desiderata*, (3) *Museum Arrangements*, (4) *Museum Appliances*, (5) *The British Museum of Natural History* (1884, 43 pp., with illustrations, sixpence), and to I. A. Picton's paper, *Primeval Man*, a lecture illustrative of the prehistoric remains in the ethnographical collection of the Liverpool Museum, 1881 (27 pp., with 5 plates, two-pence). Collecting expeditions are organized by the museum, such as one in 1898, which went to Socotra.

The annual expenditure is \$52,000. The officers are: Director, H. O. Forbes; curators of the Derby Museum, J. A. Clubb and W. S. Laverock; and curator of the Mayer Museum, P. Entwistle.

XII.—DUBLIN.

Dublin is a seaport with about 250,000 inhabitants, without factories, and consequently reasonably clean, though not free from soot.

36. SCIENCE AND ART MUSEUM.

The Science and Art Museum comprises, with the National Library (fig. 108), a large, imposing, and beautiful group of buildings, inclosing on three sides a courtyard, which is fenced by a grill in front. The central building, the Leinster House (the former castle of the Duke of Leinster), is occupied by the Royal Dublin Society. Here are also located the administrative offices of the museum. On one side of this is situated the museum and on the other the library (fig. 108), both erected nearly alike by T. N. Deane & Sons and opened in 1890. The natural history department has a wing to itself (fig. 109). In the rear is an extensive park, in which, near the library, stands the National Gallery.

The Science and Art Museum is open weekdays, admission free, from 11 a. m. till 5 p. m. and closed only on Good Friday and Christmas Eve. On Tuesdays the department of art and industry, and on Thursdays the natural science department, are open until 10 o'clock in the evening. The former is open on Sundays from 2 to 5 p. m. The number of visitors in 1900 was 425,884, of which 64,165 came on Sunday afternoons.

This museum, like the one of the same name in Edinburgh, is copied more or less after the South Kensington Museum, with the addition of a natural science collection. This uniformity of the museums in the Island Kingdom corresponds to the uniformity of life there, which in Germany and France is much more varied. It is often said that

individual freedom of development is greater in the English than in the German, but this appears to me to be very questionable.

The interior of the museum building does not altogether harmonize with the beautiful and impressive exterior. There is a central, large lighted court with two galleries, one above the other in the style of a railway station, overdecorated, checkered, and somewhat wanting in good taste, even in the eyes of the officials themselves (it is called there the "German" taste; that is, like the cheap, inferior wares that were formerly imported); adjoining is a great series of rooms, of which some are very dark, especially the one containing the ethnographic collection. The poor lighting could be much improved by the Luxfer prism glass, but this scheme has been adopted as yet to very limited extent by the museums of the Island Kingdom.

The zoological collection, too, has a large hall, lighted from above, with two galleries superposed (fig. 110), but the lighting facilities are somewhat meager, the cases and desks primitive, and the installation

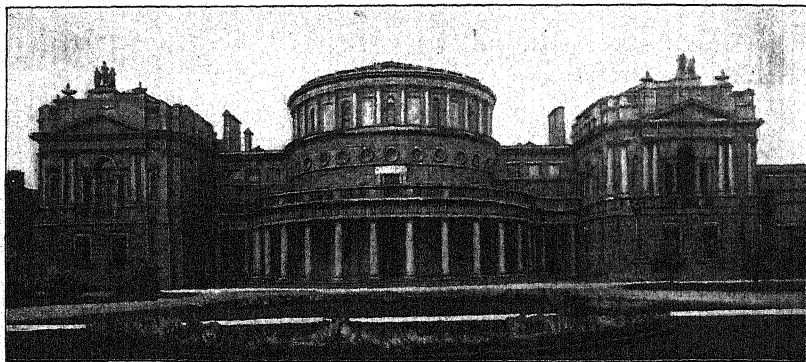


FIG. 108.—National Library of Ireland, Dublin, Ireland.

not very elegant. I mention especially a Shakespeare case, with birds trained for hunting, falcons, and the like, together with passages from the works of the poet. Very noteworthy is the representation of the geographical distribution of animals in seven sections; distribution in general and six geographical regions. I know only one museum in the world where the same thing is attempted, namely, the Museum of Comparative Zoology in Cambridge, Massachusetts, which I hope to describe in a future report. In Dublin this exhibition is not developed very extensively, but it is highly commendable. The great museums of the world (London, Paris, Berlin, New York, etc.) have nothing similar to this, yet they only are in a position fully to carry out such a scheme. The systematic exhibit must necessarily be supplemented by a geographic one. It is a matter of satisfaction that at least one European museum, too, has undertaken this important task, even though on a small scale.^a Very noteworthy also, and as I believe unique, is the

^a It has lately also been tried in the Dresden Museum.

exhibition in the "History of Animals Collection." It represents the history or the origin of species, classification, variation, natural selection, instinct, development, etc.

A conspicuous feature of the large collections is the one representing Irish archeology, with rich and rare series, among them a large number of gold ornaments. The cases here are to some extent better, but they are closed by padlocks suspended on chains, the appearance of which is not very pleasing. The gold treasure is inclosed in a steel fire and burglar proof case, which is especially guarded. In this museum, too, the policeman plays a great rôle. A valuable antique gold ornament, discovered in Ireland in 1896, was purchased by the British Museum, but is claimed by Ireland.^a

Since the art and art-industrial collections of the museum cover all branches, as in the South Kensington Museum, I can not consider them

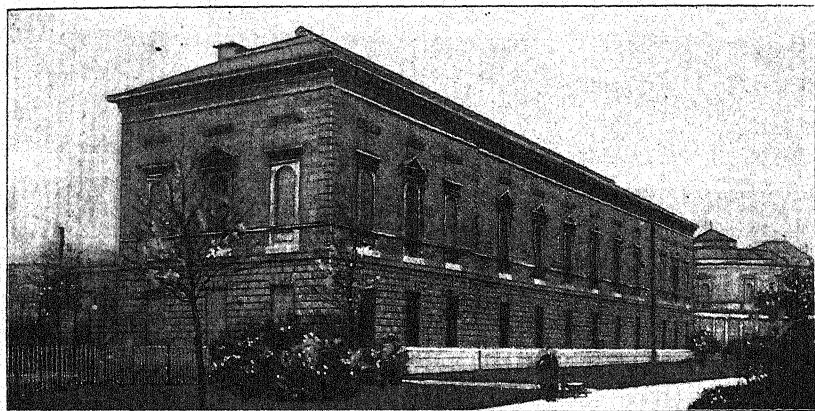


FIG. 109.—Science and Art Museums, Dublin, Ireland. Natural History building.

properly in a brief space. They are very notable (for example, the historical portion), but their exhibition offers few individual features.

The ethnographic department, though it has many gaps, is rich in old South Sea objects, though it is not yet thoroughly arranged. I was much impressed with the good labeling in some of the cases. The large type used in printing the labels is conspicuously better than the small letters almost everywhere in use. They can be read without effort—not so with the "South Kensington labels," which are distributed over the entire country. This use of large type is well worthy of imitation. Another arrangement which appealed to me as worthy of adoption is that in many of the cases there is hung a printed bibliography covering a

^a See *Museums Journal*, I, 1901-2, pp. 175, 238; compare also *Proceedings of the Society of Antiquities*, Scotland, 3d ser., X, 1900, pp. 4-7. It has been transmitted, in 1903, from the British Museum to the Dublin Museum, after a lawsuit which was won by Ireland. See *Nature*, Nov. 27, 1902, p. 89, and *Museums Journal*, III, 1903, p. 23.

special subject. The valuable bulk of the ethnographic collection indeed is loaned by Trinity College (University), whose ownership, however, is only a matter of form (Catalogue, 1895, see p. 581). In this part of the collection are very rare pieces obtained by the Cook

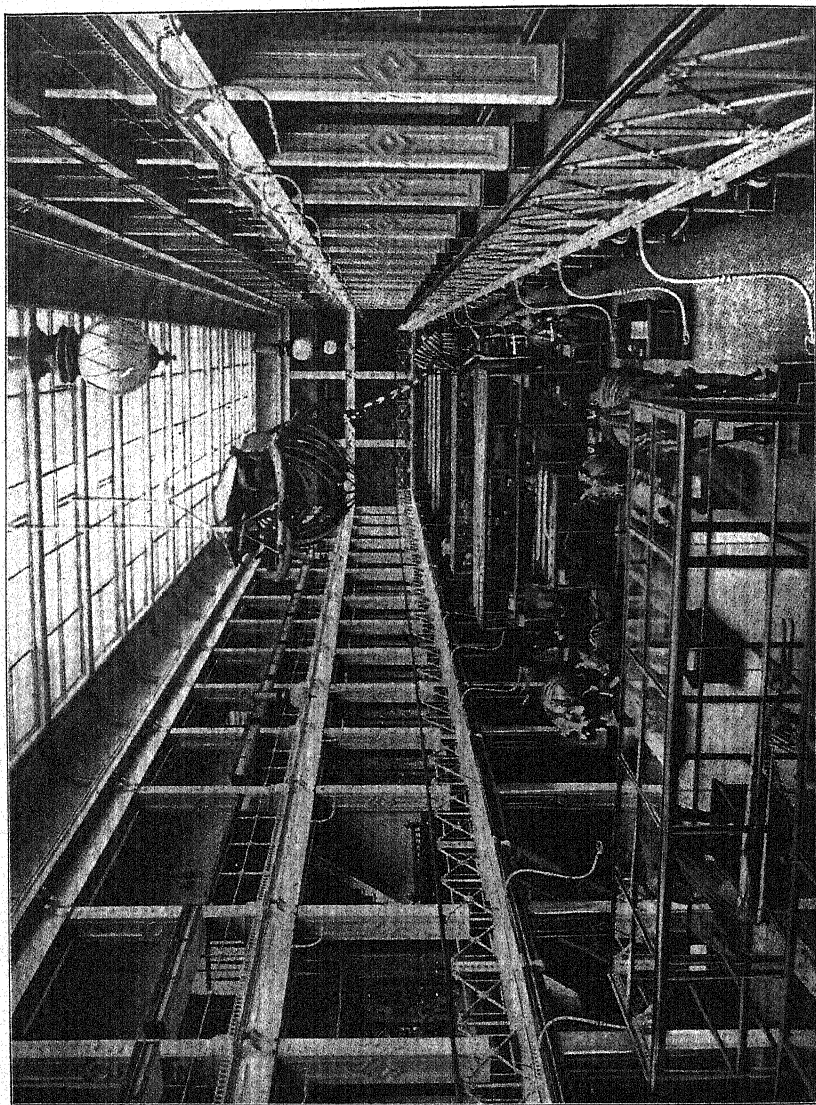


FIG. 110.—Science and Art Museums, Dublin, Ireland. Hall of the Zoological Department.

Oceanic explorations, besides others from New Zealand, Hervey, Fiji, etc. A description of these treasures, with illustrations, would be appreciated, since Dublin is not so easy of access. Each region is divided into eight groups—fire, war and the chase, music, clothing, house utensils, agriculture, religion, miscellaneous.

In order to convey an intelligent idea of the rich contents of the great collections I give, in conclusion, the principal divisions from the Short Guide to the Collections, in the order in which they are there set forth:

Art and industrial division, including antiquities and ethnographical collections.—Greek sculpture; architectural ornaments; works of times after the Renaissance; Italian; French; casts of statuary; Greek and Roman antiquities; Egyptian antiquities; ethnographical collections; oriental collections, chiefly Indian; Italian architectural ornaments; musical instruments; furniture; Assyrian and other oriental antiquities; enamels; brass and bronze; iron; English silver; Irish silver; foreign silver; Leinster collection of postage stamps; Irish antiquities (bronze tools, gold, early Christian art in Ireland); arms and armor; carved ivories; copies of works in ivory, bronze, marble; Japanese art; architectural design; water colors and sketches; miniatures; engraving and etching; pottery and porcelain; China, Burmah, Ceylon; lace; machinery and manufactures.

Botanical department.—Index room; economic collection; herbarium.

Natural history division.—History of animals collection; geographical distribution collection (general distribution, Australian region, Ethiopian region, Oriental region, Palearctic region, Nearctic region, Neotropical region; Irish animals; injurious insects; general collection; fossil animals.

Geological and mineralogical departments.—Mineralogical and petrological collections; geological collections; collection of Irish minerals; collections of geological survey of Ireland.

I have before me the following publications (Department of Agriculture and Technical Instruction for Ireland; Institutions of Science and Art, Dublin):

Report of the director for the fifteen months ending 31st March, 1901, with appendices. 8vo, 1901, 39 pp.

Short Guide to the Collections. 19th ed., s. a. 4to, 10 pp. (half penny.)

Guide to the Natural History Department. Series I: Vertebrate Animals (recent). Part I—Mammals and Birds, by A. G. More. 8vo, 1887, 38 pp. (4½ pence.) Series II: Invertebrate Animals. Part I—Recent Invertebrates, by A. C. Haddon. 8vo, 1887, 17 pp. (3 pence.)

A list of Irish Birds, by A. G. More, 2d ed. 1890, 38 pp. (4 pence.)

Guide to the Collections of Rocks and Fossils, by A. McHenry and W. W. Watts. 8vo, 1898, 155 pp. (9 pence.)

General Guide to the Art Collections: Part I: Greek and Roman Antiquities. Chapter III—Greek and Roman Coins. 8vo, 1899, 107 pp. (1 penny.) Part IV: Lace and Embroidery. Chapter I—Lace. 8vo, 1899, 23 pp. (1 penny.) Part VIII: Furniture. Chapter I—Italian Furniture. 8vo, 1899, 11 pp. (1 penny.) Chapter II—French Furniture; also Dutch, Flemish, German, Spanish, and Portuguese. 8vo, 1900, 22 pp. (1 penny.) Chapter III—English Furniture. 8vo, 1900, 22 pp. (1 penny.) All three by G. T. Plunkett. Part XV: Ivories. 8vo, 1899, 49 pp. (1 penny.)

Collection of Weapons, etc., chiefly from the South Sea Islands. 8vo, 1895, 16, 62 pp.

Two Lectures on the Art of Lace Making, by A. S. Cole. 8vo, 1884, 20 pp. (2½ pence.)

List of some books in the National Library of Ireland or in the Library of the Museum which may be useful to visitors to the Museum. Natural History Collections: Zoology, Geology, and Mineralogy. 8vo, 1900, 16 pp. (1 penny.)

In the winter of 1900-1901, 22 free lectures were delivered by 14 different gentlemen, admission by card, which were attended by 755 persons, a comparatively small number.

The director of the entire museum is G. T. Plunkett, who is also director of the Royal College of Science, the Metropolitan School of Art, the National Library and the Botanical Gardens. Other officers: Curator of the department of art and industry, Thomas H. Longfield; assistants, J. J. Buckley, E. P. Alabaster and A. McGoogan; curator of the department of Irish antiquities, G. Coffey; curator of the natural science department, R. F. Scharff (a German); assistants, A. R. Nichols, G. H. Carpenter, R. Pride; of the botanical department, T. Johnson; of the department of geological survey, R. Clark; of the mineralogical department, G. A. J. Cole.

The annual expenditure in 1897-98 was \$120,000. The administration appears to be cumbersome; since, for example, in the ethnographic department, authority must be obtained from London (from the science and art department), for a purchase, even though it involves but a few pounds. Whether this condition exists in the other departments, I do not know.

37. NATIONAL LIBRARY OF IRELAND.

The National Library of Ireland is magnificent without, but within is not up to strict modern library requirements, though the building was completed only in 1890. The architect, as is so often the case, sacrificed interior adaptability to exterior appearance. The stack system (five decks) is made with floor plates of hammered glass and iron, but with wooden racks. In many places the stacks are so poorly lighted that electricity must be used even in daytime. The horseshoe-shaped domed reading room (68 by 65 feet and 52 feet high,) occupies much space in the middle of the second story. There are three smaller reading rooms. On either side of the rotunda are the book stacks, but only those in the right wing are as yet in use. Each is 110 feet long, 36 feet wide, and 54 feet high, with a capacity of about 200,000 books. The middle one of the five decks of the book stacks is on a level with the great reading room. In each of these there are 26 double racks, approximately 8 feet high, with an intervening space of 40 inches, each with 8 or 9 shelves. On the ground or first floor, in the center, are located, in addition to the broad entrance hall and

the great stairway, the administrative offices. Whatever shortcomings this building may have, it has at all events been carefully thought out and not erected after the general pattern. It is surpassed, however, by the new American libraries. I received the impression that they strive to be successful, but the means at their command are too limited. Annual reports and catalogues of the annual accessions are published. The library increases rapidly through donations. It contains at present 150,000 volumes. It must be emphasized that the arrangement is after the Dewey system, this being, perhaps, the only large library in Europe which employs it. It works excellently, though the books, on account of the small force of assistants, have no outside markings. The Dewey classes are distinctly indicated by labels on the stacks and easily found. Within the classes an alphabetical arrangement is followed, and when there are more books than one can conveniently review at a glance a sequence of the letters is attached to the stacks. The general opposition on the part of librarians to the Dewey system is perhaps based principally on the immense amount of labor involved in the reassignment and rearrangement of a library, which can not be undertaken without very considerable means, and then, again, other systems have also their good points.

It is open from 10 a. m. to 10 p. m. During 1900 there were 148,405 readers.

(See also F. J. Burgoyne, *Library Construction*, 1897, pp. 153-158, with ground plans and cross sections, and J. J. Ogle, *The Free Library*, 1897, pp. 191-192.)

38. NATIONAL GALLERY.

The National Gallery has just received the addition of a large new wing, with skylights, and side lights in alcoves; in these the walls are not at right but at obtuse angles, which is certainly preferable. The large building makes, by its simplicity, a very favorable impression. The old portion was constructed during 1859-1864, and cost \$150,000. In 1898 there were on exhibition 464 paintings, 348 drawings, water colors, etc., 280 portraits, 16 busts, and a collection of casts. It is open on four week days from 12 to 6 p. m. (or until darkness sets in); on Sundays from 2 to 5 p. m. (or until dark), admission free; on two week days it is open from 10 a. m. to 4 p. m., admission sixpence. (See Catalogue of the pictures and other works of art in the National Gallery and the National Portrait Gallery, Ireland. Dublin, 8vo, 1898, 361 pp.)

39. ANATOMICAL INSTITUTE OF THE UNIVERSITY.

I also visited the anatomical collection, on account of its anthropological department, but as the hall was just being rebuilt and the cases shoved together, I could see but little. The collection of

skulls appears to be not unimportant. The director is D. J. Cunningham, professor of anatomy, also well known as an anthropologist.^a The Anatomical Institute is excellently installed, the large dissecting hall being light, airy, and furnished with the most beautiful dissections, which here are preferred even to the best colored pictures.

UNIVERSITY (TRINITY COLLEGE.)

The university (Trinity College) consists of an extended group of buildings beautifully situated in a large park which is quite within the city. I could not examine it, however, because it would have consumed more time than I had at my disposal.

XIII.—PARIS.

My remarks may well be somewhat brief, considering the abundance of matter and the fact that Paris is universally known. I confine myself to a few notes on my observations.

40. MUSEUM OF NATURAL HISTORY IN THE BOTANICAL GARDEN.

[Muséum d'Histoire Naturelle au Jardin des Plantes.]

The majority of the museum halls in the Jardin des Plantes are of the old-fashioned style, which have been already criticised by J. Marcou in his book, well worth reading, *De la Science en France*, 1869. But in 1889 a large, new, zoological museum was completed, which, as I then saw it, was nearly filled and is now already overcrowded. Furthermore, there was built three years ago a paleontological, comparative anatomical, and anthropological museum, as the first of a series of new galleries which are to be located adjoining each other on the Rue de Buffon, the southern boundary of the Garden, their long sides turned toward the Garden and the street.

ZOOLOGICAL COLLECTION (GALERIES DE ZOOLOGIE).

The Galeries de Zoologie is a large rectangular building, 100 meters long, 62 to 70 meters wide, and about 25 meters high (without cupola), with a lighted court 70 meters long, 41 wide, and 20 high, and three galleries superposed. To say it is a failure is not my judgment alone. The exterior is in very good taste. The great glass-covered lighted court was designed by the architect, J. André, as a central space to be ornamented with plants, and was not intended for the collections. It is full of large mammals, mounted on too conspicuous wooden bases—an immense herd, all standing free and some of them impossible to inspect except at a distance. The entire space of the height of three

^a Mr. Cunningham has since been appointed professor of anatomy in Edinburgh, as successor to Sir William Turner. The director of the Anatomical Institute in Dublin is now Prof. J. Symington, formerly in Belfast.

stories from the floor to the glass roof is empty. It would be well adapted for the large whale skeletons,^a but they are exhibited in the collection of comparative osteology. Besides, they would detract still more from the only source of light for the broad encircling galleries, for these obtain their light only from above. In consequence of this they, especially the lower ones, are much shaded, being in some places so dark that nothing can be seen. In the front (Garden) portion of the building are halls 53 by 10 meters, provided with light from one side; on the ground floor these are 7 meters high, in the second story 6, in the third story 5, and in the fourth story, with the roof work, 7 meters.

In examining this building one can learn, as in many others, how a museum should not be designed. A few of the special features of the building have been published by F. Monmory.^b The building cost \$800,000, the fixtures \$600,000. Photographs were not obtainable.

The collection is installed in not very pleasing wooden cases, without great care. In addition the cases are in some instances overcrowded and filled to the top, where nothing can be discerned. There is still followed here the almost universally abandoned practice of exhibiting very many stuffed animals, reasoning that people who donate things—and much is here donated—wish to see where the objects are placed. This practice will necessarily have to be discontinued at some time, even though republican France is more conservative than elsewhere. The working rooms of the officers and preparators are mostly in a separate old building, far away in the Rue de Buffon, which is very inconvenient.

COMPARATIVE ANATOMICAL, ANTHROPOLOGICAL, AND PALEONTOLOGICAL COLLECTION.

[Galeries d'Anatomie Comparée et d'Anthropologie.]

This collection was opened in 1898.^c This building also has a tasteful exterior of red brick, with light stone trimmings and artistic decoration. On the side facing the garden there are four bronze and eight marble reliefs, representing human and animal life, by Barrias, Marqueste, Coutant, and Gardet; in front of these, two statues by Frémiet. On the narrow side, where the entrance lies, is a tympanum, by Allar, representing the three kingdoms of nature. The building is about 86 meters long and 15 and 27 meters wide. It is fireproof, of iron, stone, brick, and cement. The protection against fire was considered to such an extent that the workrooms of the staff are located

^a See also G. Pouchet: De l'affectation de la grande salle centrale des nouvelles galeries du musée. *Revue Scientifique*, 3 sér., XLI, 1888, p. 334.

^b *Revue générale de l'Architecture* (4), XII, 1885, pp. 2492-51, pls. LXIII-LXV.

^c See *Bulletin des Nouvelles Archives du Museum d'Histoire Naturelle* (3), X, 1898, pp. iii-xii.

in an old building in the Rue de Buffon, half a mile away, which is very annoying, since in the present day complete security can be had without this inconvenience. As a further security against fire, electric lighting is not used. The building with its furniture cost \$625,000. The architect was F. Dutert. In the white entrance hall with columns there is a marble group by Frémiet, and animals in relief as capitals, the whole simple, in the refined taste characteristic of the French. On the right there is a charming little lecture hall with a ceiling picture by Cormon, The March of the Races of Men toward Light, and ten pictures illustrating prehistoric times. The building consists principally of a ground floor, lighted on both sides, and a second floor, lighted from above, with a gallery. The projecting stairway hall is situated at the eastern narrow side, and is of four stories, with smaller rooms such as the lecture hall already mentioned and some rooms for collections adjoining. It is surmounted by a high, arched roof. The large hall on the ground floor (fig. 111) is not partitioned, is somewhat narrow (14 meters inside) compared with its length of 77 meters, and at the same time its ceiling is somewhat low (6.6 meters)^a compared with its length, but its effect is excellent and imposing, and is a model as to its lighting. As regards the points of the compass, however, the building is as unfavorably located as possible. The long sides look toward the north and the south and the collections are consequently exposed to the sun during the entire day. For this especial collection it makes naturally very little difference, but the window shades must be drawn on the south side when the sun shines, and this bathes everything in a colored light, an error which we observe in many museums in the world, but which should always be avoided. The windows begin at a height of 2.6 meters from the floor, and are 4 meters high, 3 meters wide, the window piers being 1.8 meters wide. The cases, which are 2.4 meters high, stand against the wall under the windows, and therefore receive their light from the high windows on the opposite side. At the end of the hall on the narrow side is a gallery. In this large hall the osteological collection is installed, the larger animals in the center being uncovered—a magnificent view—the others being inclosed in wall cases. These, made with iron framework but wooden bases, though not answering the

^a The height of the halls I could not determine on the spot, but Mr. H. Sinding-Larsen, an architect of Christiania, had the goodness later to give me these measurements, together with others, without, however, being able to vouch for their absolute accuracy. In this museum, as in almost all which I visited in Europe and the United States, it is very difficult to obtain information concerning the buildings, since the directors, however willing they may be, do not have the data in their possession, and the administrative and building authorities who have this information can only be approached by foreigners with great inconvenience and with a great loss of time. To obtain special information through correspondence is generally very difficult and often impossible.

strictest claims and not dust proof, are yet good and serviceable, except that they have too much framework and too small doors. The installation has been attended to with the greatest care and everything carried out with a degree of excellence that we seldom find.

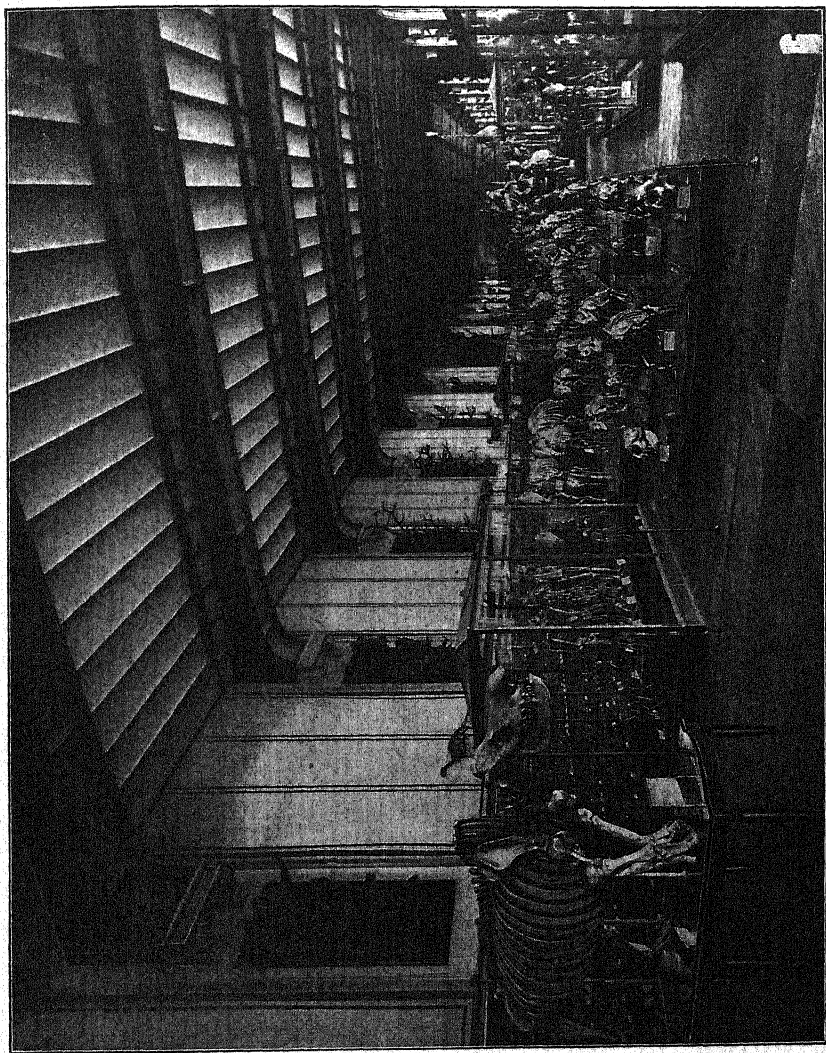


FIG. 111.—Museum of Natural History, Paris, France. Collection of comparative anatomy. First floor of the "Galleries d'Anatomie."

In the second floor (fig. 112) the large hall is also not partitioned, and is 10 meters high to the skylight; and to the galleries, 4.6 meters. In the open space under the skylight are the large specimens of the paleontological collection without cover, which likewise produce a splendid effect. Along the walls, in cases 2.4 meters high, under the gallery, are the smaller skeletons and special exhibits of such a collec-

tion whose extent, dating back to the beginning of the Paris Museums (founded in 1626), is very important. There is here also an extremely imposing installation, everything being well worked out and labeled. The light in the wall cases is, however, not always sufficient, since the main source is above, and only at greater intervals are there side win-



FIG. 112.—Museum of Natural History, Paris, France. Collections of paleontology and anthropology. Second floor of the "Galerées d'Anatomie."

dows. It would certainly have been better if the second floor, like the ground floor, had been arranged as a covered room with light from both sides, but the architect here, as so often happens, has subordinated the interior uses of the building to its exterior beauty. Light from above, which is perhaps best for a picture gallery, is not always

well suited for natural history collections. The galleries are, for the most part, imperfect.

The showy wrought-iron railing, about 250 meters long, which incases the stairs to the gallery, and the entire railing of the same, is very obtrusive. It represents large fern leaves and is by itself a piece of art, but in this place it is too massive, too conspicuous, and consequently distracting. In the gallery the anthropological collection is installed (fig. 113) as far as the space allows, comprising the long-famous collection of skulls, casts, pictures, etc., relating to physical anthropology. Besides this a prehistoric collection is in adjoining halls, above the lecture room on the ground floor. This anthropological department is not quite so elegantly exhibited and labeled as the paleontological and osteological collection.

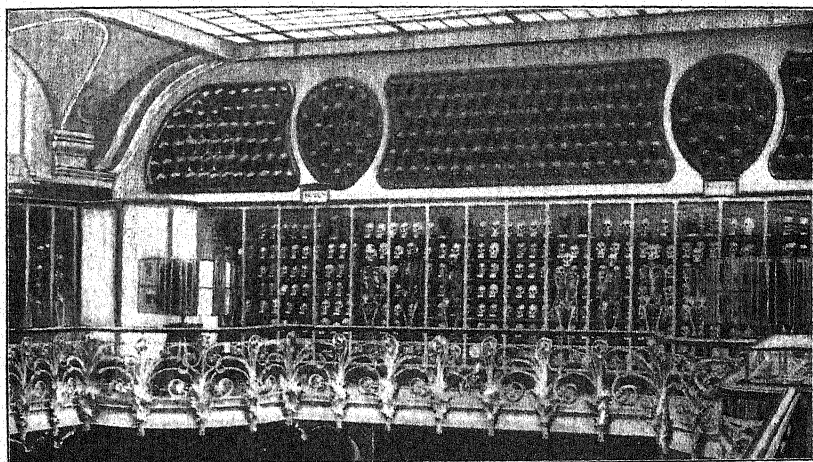


FIG. 113.—Museum of Natural History, Paris, France. Part of the anthropological collection. Gallery of second floor of the "Galleries d'Anatomie."

It is planned to place the "galerie" which is next to be built closely adjoining, so that the present collections can be extended, and room be obtained for those portions which belong to this section, which for lack of space can not now be shown at all, such as the remainder of the anthropological collection, the whale skeletons, etc. They here also built too sparingly from the beginning, but were wise, however, to arrange the new museum so that it can be horizontally enlarged. The style of architecture does not permit of its being extended in a vertical direction.

There is a parquet floor, very stylish to look at, but wearisome to the visitor, since scarcely anyone is accustomed to walking on smooth parquets without carpets being spread over them.

The new "Galleries d'Anatomie" are, without doubt, a prominent production in the line of museum technic. They exhibit a rare taste, and the building closely approaches being a faultless model of its kind.

It is in a most happy way different from the general pattern. Everyone who has a museum to build should study carefully this Parisian one and adopt its good features. This advice can be given with regard to but very few museums.

Photographs of the exterior were unobtainable.

I am indebted to Dr. O. Richter, assistant in the Dresden Ethnographic Museum, for the following separate data recorded by him on his visit in February, 1902:

Ground floor (see fig. 111).—Wooden cabinets, with iron doors without crossbars, set in wooden frames, the latter, however, only above and below, and laterally at the end of long rows of cases joined together. Doors with steel frames all approximate 75 cm. wide. The numbers of the cases are indicated by raised metal figures on the bottom, inside; color, silver. The shelves are of glass, also the bases for the installation of individual objects on the shelves, so that glass rests upon glass. The stands for specimens are of German silver. The rails and brackets are of iron, the latter secured by screws. The labels are of gray paper or pasteboard in red and black round hand; the mountings are placed obliquely or horizontally; they are of dark-blue glass if the objects are light colored. The same applies to alcoholics, in bottles, presenting a dark-blue background. The closing of alcoholic bottles with tin foil is obtrusive. The wood of the cases (and horizontal cases, see below), the bases of the free-standing specimens, the floors and shelves, are uniformly light oak-brown. The rails and backgrounds of the cases, however, are reddish brown.

Second story.—Here the mountings are also of wood covered with reddish-brown cloth; stands of brass, not of German silver. Horizontal cases with wooden drawers below, and narrow metal frames above; no plate-glass pannels, but with crossbars. The construction is as follows (see figs. 111 and 112): The wooden cases are surmounted by horizontal glass cases with gold-bronze metal frames on which are tongues for lifting the covers. The wooden drawers are supplied with massive round, button-like, wooden handles (two to each), set in hollowed recesses. A row of these drawers, situated one above the other, may be locked at the same time, through a general catch, which is located in the upright between the several rows of drawers.

Gallery.—Anthropological collection (see fig. 113). Skulls on black bases with four ball-shaped feet. The arrangement is a geographical one: skulls, skeletons (on light-brown wooden bases of the same form as the skull bases), casts of types, and illustrations, etc.; illustrations of types arranged also in the shape of fans. Here the cases have drawers below, as in the horizontal cases already described. Labels: The general ones black on white and of larger size; special ones in black on green with green borders and black on gray with red borders. Casts of types (Schlagintweit Collection) also in the open, on the wall, in larger groups above the cases (see fig. 113); these types have the form of medallions. Similar typical heads in square frames and on gray backgrounds also in the cases. Some of the skulls are under glass, with light-brown paper strips on the edges.

While in Great Britain and Ireland, as well as in America, the museums keep open later than they ought, the limitations in this regard in the collections of the "Jardin des Plantes" are very marked. Entrance is more or less beset with difficulties, and it is only by exception that one can go about without hindrance. While in the former case they go too far, here, through lack of employees, they do not go far enough.

The annual expenditure of the Jardin des Plantes (museums, zoological and botanical gardens), is \$200,000.

41. NOTES ON VARIOUS MUSEUMS AND LIBRARIES IN PARIS.

ETHNOGRAPHIC MUSEUM IN THE TROCADÉRO.

I was compelled to visit this museum twice, since in the absence of the director I could not obtain access to all its departments on the occasion of my first visit. Since 1889, when I saw it, it had not improved in its administration, though it had increased much in its possessions. The Asiatic collections have been removed and are now exhibited only in the Musée Guimet which, since that time, has come into the possession of the Government. The halls of the Trocadéro (formerly the Exposition Palace) are not well adapted for this collection. The cases are of the most primitive kind (mostly old exposition cases), the method of installation is no less so, consisting in part of trophies on the walls; the labeling is incomplete and intended more for the general public. The collection is not much cared for, in short, it has fallen behind the modern museum technic. A lack of sufficient means is the cause for this. How surprising it is that the enlightened French Government is so parsimonious in this respect! Paris, which in many respects surpasses all ought not to retrograde in the matter of ethnography, but now a great effort would be necessary to bring the collection up to modern standards. The small number of officials in charge of this rather extensive collection bears no relation to its present needs; on this account, also, only one of the various halls is opened at a time, and therefore no adequate publication of the valuable materials can be made. The annual expenditure is only \$4,500.

GUIMET MUSEUM (PLACE D'JÉNA, 1).

This is now a Government collection. This museum I was also compelled to visit twice for the same reason that I did the Trocadéro. On account of lack of assistants it opens its halls only intermittently, and in the absence of the director admission can not be had to the closed portion. The plan of Mr. Guimet, to establish a museum of comparative religions, has been limited to Asiatic religions and extended, on the other hand, to cover the general ethnography of Asia. In respect to east Asiatic religions, the museum is over rich and suffers from lack of space; in view, however, of the difficulty of extending the already considerable building, it being hemmed in by other structures, a serious problem is presented—certainly an instructive circumstance for the consideration of those contemplating the erection of new museums. Although the building was erected for the purpose, it does not meet the demands of modern museum construction, either in the relative position of the several halls to each other, which are influenced by its triangular ground plan, or in respect to lighting, though, notwithstanding all this, it has many good features. (Photographs were unobtainable.) I must pass over here the history, the contents,

and the valuable publications of this most justly famous museum, as it would lead me too far. Besides, Paris is easily accessible to everyone and a desirable place to visit. I will only remark that the exhibit, so far as the contracted space allows, is very good; the labeling, however, is so deficient as to oblige one to purchase the guides and catalogues. The labeling of the ceramic collection is especially defective, although not in the same degree as in many other museums. Ground floor: Chinese and Japanese ceramics; Siam and Cambodia. Second floor: Indian, Chinese, Japanese religions; Indo-China. Third floor: Japanese paintings; Greek, Roman, and Egyptian antiquities; Korea. The departments relating to Japanese religions and the other Japanese collections impressed me as the most noteworthy and as most thoroughly worked up and labeled. The nephrite collection contains wonderful specimens. At all events the museum is in its field unexcelled, though it is capable of improvement as to technical museum arrangement. The annual expenditure is \$9,500, nothing being allowed for purchases; Mr. Guimet has thus far himself provided for these in some cases. The increase in the collections, therefore, depends mostly on donations.

LOUVRE.

I refer only briefly to the Louvre, which I also visited on two occasions. The collections are of exaggerated extent. The installation is in general antiquated and little cared for; the labelling unsatisfactory. I received the impression that an energetic hand could improve the existing conditions. It apparently suffers also from lack of means. While formerly (as late as 1889) umbrellas and canes could be carried among the collections, they must now be checked (without charge). The danger of fire in the Louvre is great. The most beautiful is the new Rubens Gallery, opened in 1900, and excellently lighted, which can not be said of the adjoining Van Dyck hall, also opened in 1900, nor of most of the Louvre halls. The Marine and Ethnographic Museum on the third floor is in the same defective condition that it was when I saw it eleven years ago. It is in some respects very rich in specimens, but it is not scientifically fitted up, and its installation is as unfavorable as can be imagined. The collection of Japanese and Chinese porcelains (collection Grandidier), containing about 4,000 specimens, in a poorly lighted half story, is carelessly installed in cases, and it is entirely undetermined and unlabeled. I saw nothing in the Louvre in the way of museum construction or technique which would be worthy of reproduction in a new building. I do not wish, however, to put myself in the light of one overlooking the importance of the Louvre among the museums of the world.

GALLIÉRA MUSEUM.

The Musée de Galliéra is a sumptuous building in the Italian renaissance style, by Ginain, in the neighborhood of the Musée Guimet,

completed about twenty years ago. It is tasteful and grand alike in its exterior and interior. It contains a municipal art collection. In view of the fact, however, that this is yet too small to fill the large building, it is partly occupied also as show rooms for the sale of art industrial collections. It has magnificent, high, excellently lighted halls, constituting a monumental structure of a taste and solidity seldom encountered among modern buildings outside of Paris. It is very well worth seeing and departs widely from customary museum models. It is fireproof. A large apparatus for heating by hot air is installed in the very spacious, light cellars.

NATIONAL LIBRARY.

The National Library gives evidence of the fact that an old library can also adopt new improvements. About a third of the 2,700,000 volumes^a is installed according to the stack system in five decks, each 2.5 meters high, with passages which admit the light; though all this is not in so perfect a manner as in the great new American libraries, yet it answers the purposes for which it is intended. The reading room (*salle de travail*), 43 meters long, 34 wide, and 20 high, by H. Labrouste, with some 340 seats, is more attractive and more artistically arranged than that of the British Museum with its 300 seats. The written catalogues on the crescent-shaped northern end are easily accessible and excellent. The printing of the catalogue (alphabetically by authors) progresses slowly on account of lack of means, the first six volumes of about 1,200 pages (down to Bancroft) having been completed only after four years' labor, according to which it would require sixty years more to finish the work, though it is expected to accomplish it in twenty years, as additional means are hoped for. In so wealthy a country as France it is surprising that so little assistance is given an undertaking of such general utility. In this respect the British Museum is unrivaled. (I tested the manuscript catalogue and found there, among others, more than twenty of my writings, which speaks in my eyes for the great comprehensiveness of the library.) The public reading hall (*salle de lecture*), on the contrary, is dirty, ugly, and in the highest degree unattractive; it consists of several rooms. A new one, however, is about to be constructed. When all of the additions to the library which are in contemplation are completed it will be magnificent. I could only cursorily examine the other rich and celebrated collections there. Here the installation, partly antiquated, seemed to me to be historically justified and accommodated to the objects themselves. The reading rooms are open from 9 a. m. to 4 or 6 p. m., but not in the evening, differing in this respect from England and America. The annual expenditure is \$162,500, of which, however, only \$20,000 may be allotted to the purchase of books and \$20,000 to the printing

^aAlso 250,000 copper-plate engravings, 150,000 coins and medals.

of the catalogue. I call attention, among other things, to the list of foreign periodicals, *Liste des Périodiques étrangers* (2d. ed., 178 pp., octavo), published in 1896, containing 4,324 numbers.

SAINT GENEVIÈVE LIBRARY.

The Bibliothèque Ste. Geneviève is an original and beautiful building (close by the Pantheon, in the neighborhood of the Sorbonne), constructed in 1843-1850, by H. Labrousse, and also interesting to me because the celebrated Public Library in Boston—which I hope to discuss in detail in a future report—resembles it in its exterior. The Boston building, however, is a square of 75 meters, with a large courtyard inclosed by four stories, while the Ste. Geneviève building is a rectangle 106 meters long, 27 meters wide, with two stories, having only four windows on the narrow side. It seems to me unjust to speak of this as a plagiarism, as has sometimes been done. The Paris Library

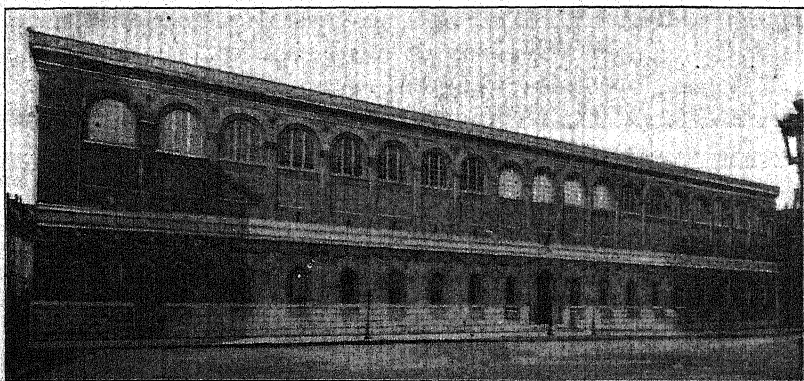
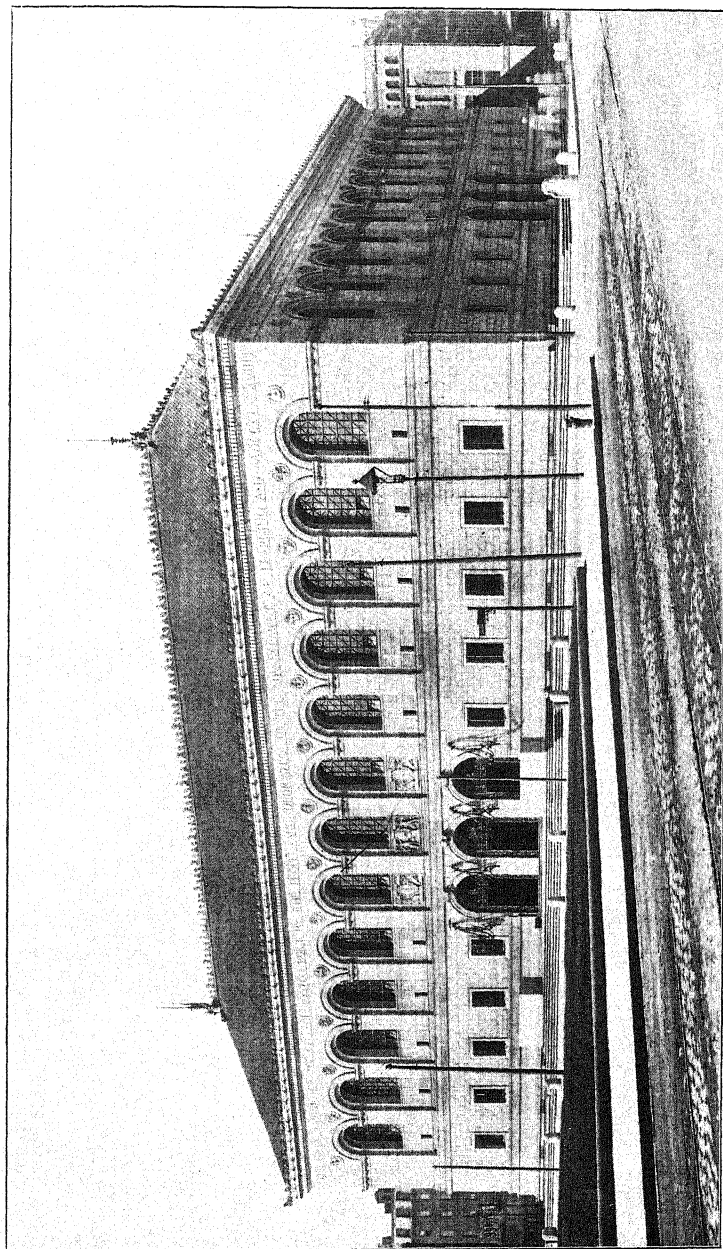


FIG. 114.—Library of Saint Geneviève, Paris, France.

cost \$325,000, the Boston Library, \$2,500,000. I include here for comparison the fronts of the two buildings (fig. 114 and Plate 40). The ground plan of the second floor, a cross section, and a side view of the Ste. Geneviève Library is given in the *Allgemeine Bauzeitung*, 1851 (Plate 386); ground plan of the ground floor in the same journal, 1852 (Plate 471). A photograph of the building was not obtainable in Paris, and I had to have the one which is here published made. On the ground floor, on the right and left of the somewhat dark entrance hall, is installed the collection of books founded in 1626 (250,000 volumes, as given by one of the librarians), according to methods which are not modern, on wooden shelves, the valuable specimens (incunabula, Aldines, etc.) in cabinets. A shallow stair hall, built on the back in the central portion, measures 2.5 by 9 meters. The large, very beautiful and noteworthy reading hall, with accommodations for 476 readers, and a comprehensive reference library, is located



PUBLIC LIBRARY, BOSTON, MASSACHUSETTS.

in the second story, and has a gallery. It takes in the entire length and breadth of the building, is 100 meters long, 21 wide, 14 high, with iron groinings and pillars, and is decorated with objects of art. It is very homelike. It is open from 10 a. m. to 3 p. m., and from 6 to 10 p. m.; lighted in the evenings by gas, electricity being not used on account of greater danger (?). The damaging influence of gas upon the books is overlooked. The total expenses are \$23,250, of which \$3,000 are for the purchase of books, \$16,000 for salaries, and \$4,250 for administration. An abbreviated catalogue and a catalogue of the manuscripts (3,500) and first impressions have been published.

I visited also the Pantheon, whose artistic decorations are not effective on account of poor lighting, and the Sorbonne, which in its new portions, decorated entirely in white, is very impressive.

There are certainly still many other things in Paris from which I might have learned something for my special purpose. This would, however, have required a much longer stay than the few days which I had at my disposal for investigating some of the many features in that city of cities.

When one has spent five weeks in large cities of England and is then immediately transported to Paris, he feels as if he had come upon the center of a higher civilization. I had that same impression years ago. This remark relates naturally only to the external appearances of life, not to the intrinsic worth of culture, which are the same in England as elsewhere. But the lower classes in the large cities of the insular Kingdom appear poorer and more degraded, their outer bearing more repulsive, further removed from enlightenment and humanity. At all events they enjoy life less. Compare the enjoyment of life of the French in the streets of Paris with that of the English in London, Manchester, Liverpool, Glasgow, etc., and you have a contrast as marked as that between day and night. If modern civilization under the influence of trade and manufactures tends to the result which has obtained in England, it is surely a regrettable departure, which is practically carrying us back to barbarism."

"Dr. T. C. Horsfall, whom I have already mentioned, says on page 3 of a very readable recent paper, *The Use of Pictures in Education*, Manchester, 1902: "What will become of England if towns like smoky, unhealthy Manchester continue to grow as they are now growing? * * * Our big towns already contain a very large and constantly increasing proportion of the English people, and a great majority of their inhabitants are living under conditions which make physical, moral, and mental health impossible. No one who knows what south and east London, Manchester, and indeed all our large towns are, can resist the conviction that, unless the majority of our people can soon be got out of such places, or unless the state of the towns is soon very greatly improved, England, now preeminently the land of cities, can not long retain her place among great nations. It would be as possible for a great cathedral to escape destruction should walls and columns be rotten, as for a great empire

The marked difference between the external forms of life in England and on the Continent results from the fact that the Island Kingdom has always attended to its own affairs and adhered to its customs and usages, while the rest of the cultivated world has learned to make life more beautiful for itself. This exclusiveness has had as a consequence a remarkable inflexibility in the manner of living, which has been fully realized by enlightened minds there. So Matthew Arnold (died 1888), one of the most esteemed of modern writers, says that the English nation has remained hopelessly in the rear in comparison with the progress of other European peoples, and that what it needs is not personal freedom, not wealth, industry, and the blessing of children, but obedience, culture, and refined enjoyment of life. The Englishman troubles himself even less than a Frenchman concerning what goes on in the rest of the world. Manufacturing and trade interests, and the strife for money, in connection with the provision for so-called domestic "comfort," which, however, in the German sense, is not such, occupy in general the monotonous grind of life from which it is not decorous to depart. Amusements among the higher classes are of a dreary sort, and the external circumstances under which they seek them are often cheerless. As a result of this, the English often enjoy themselves much more on the Continent than they do at home. The Englishman, who when abroad is most exacting, when at home is of a most touching modesty, so that the German in England appears to be exacting.

I submit these few remarks merely for the purpose of explaining why it is that travel for study in the large cities of England is not associated with much pleasure, especially since the enjoyment of the hospitality, although extended in richest measure to strangers, is rather a task, both on account of the great distances in the cities and of the customs of the country, which make ease of intercourse difficult.

to maintain its power, should most of its people be such as the inhabitants of large parts of London, Birmingham, Glasgow, and Manchester now are. Of the evil conditions affecting the life of the inhabitants of big towns those which receive most attention are drinking, licentiousness, unwholesome dwellings, smoke-laden air. * * *

And on page 21: "Very little intelligence is needed, for seeing that, if we could raise the life of our towns to even as high a level as that of Geneva or of any German or Dutch town, and escape the shame we now feel at the preventable baseness of English town life, that would be a result which, though it cost him every year half of his income, would make every well-to-do Englishman ten times richer in all that is best worth having than the richest man now is. * * * I greatly fear that England is destined to fall, a land of starved schools, of playgroundless, treeless cities, and of well-supported hospitals, reformatories, and lunatic asylums."

XIV.—BRUSSELS.

42. ROYAL MUSEUM OF NATURAL HISTORY OF BELGIUM.

[Musée Royal d'Histoire Naturelle de Belgique.]

The Royal Museum of Natural History of Belgium, which has become famous as regards its contents and management under E. Dupont, was ten years ago moved from the interior of the city (Place du Musée) and installed in a rebuilt monastery in the suburbs, in a high and somewhat isolated position. This, however, was only done with the intention of erecting a new building close by. This has now been undertaken; the house is under roof and will be ready for opening in a year.^a It is immediately adjacent to the present museum, and the buildings will communicate with each other. It is intended for the

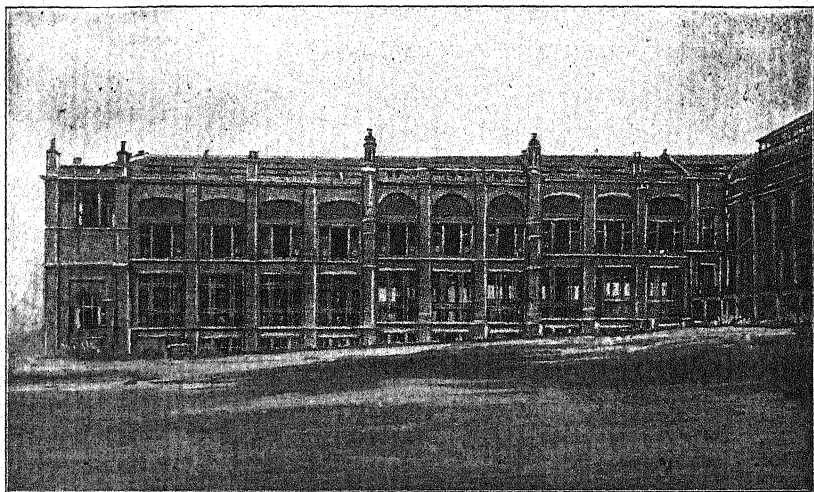


FIG. 115.—Royal Museum of Natural History, Brussels, Belgium. One of the long sides of the building.

prehistorical, paleontological, zoological, mineralogical, geological, and botanical collections of Belgium. I regard this new building as a model of its kind, and while it should not be imitated without modification, since from the start it has been specially adapted to the collections to be exhibited, yet anyone can with profit adopt some of its features in constructing a new museum building. Fig. 115 represents a long side of the half-completed structure, which adjoins the old building at right angles. It is on rising ground. Fig. 116 represents the narrow end, with the main entrance and stairway, as well as a perspective view of the other long side, likewise in a half-completed condition, and fig. 117 the main hall of the ground floor, half finished. The ascending floor has different elevations connected by steps. In

^a Will take some years longer to complete it—1903.

the center stands the framework of a new case (certainly capable of improvement). The left half of the hall corresponds with the long side shown in fig. 116. The orientation of the building appears to be not without advantage, but I am not fully informed on this point. The style is simple and attractive. The exterior is of stone. The slope of the ground is indicated by three unobtrusive divisions of the façade into different levels (fig. 115). It is entirely fireproof in construction—of iron, brick, and cement. The interior decoration will be quite simple and of uniform color. The building is conspicuous from the very limited wall surfaces, consisting, as it does, almost entirely of broad windows with but little space between (fig. 115). The entire ground floor constitutes one large undivided hall (fig. 117), with windows on both sides, and,

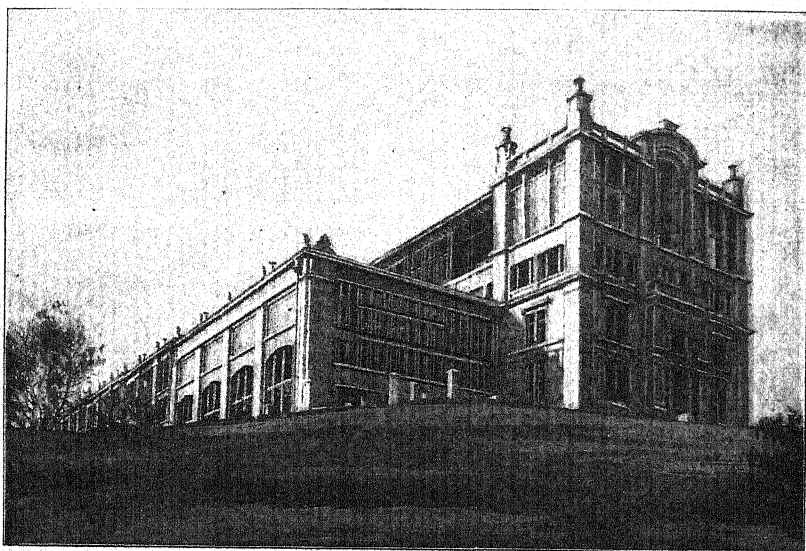


FIG. 116.—Royal Museum of Natural History, Brussels, Belgium. Narrow side of building, with entrance.

as it was feared that it would not be possible to provide sufficient light from the sides on the right and left, one longitudinal half of the hall is, in addition, supplied with skylights, there being no stories above. This large hall has double windows, contrary to the custom in most museums, as it was thought that otherwise the room could not be sufficiently heated on account of its great amount of window surface. I think this fear is without foundation; but if the cost is to be disregarded it is manifestly better so—at all events, for the purpose of keeping out the dust, in case the new method of ventilation is not adopted. (See Manchester, Glasgow, and Liverpool above.) This is not contemplated, as the system was unknown here, and the steam heating apparatus is already installed. The second and third floors cover only one longitudinal half of the building (fig. 115). The third story

is devoted to the collections; the second—practically only an intermediate story—is allotted to many workrooms, which all adjoin one another. Such an excellent arrangement is seldom found in any other large museum.

In the basement, separated by a corridor 6 meters wide, are located the preparators' quarters and storerooms, the first well lighted, the second not so well, but to be provided with electric lights. The whole length is 84.26 meters, the width 30 meters. There is one preparators' room 24.8 meters long and 15 meters wide, and three, each 18.6 meters long and 15 meters wide. Corresponding to these are four storerooms, each 7 meters wide. The height of the basement rooms is 4.5 meters; the portion under the gallery of the ground-floor hall, 5 and 7 meters.

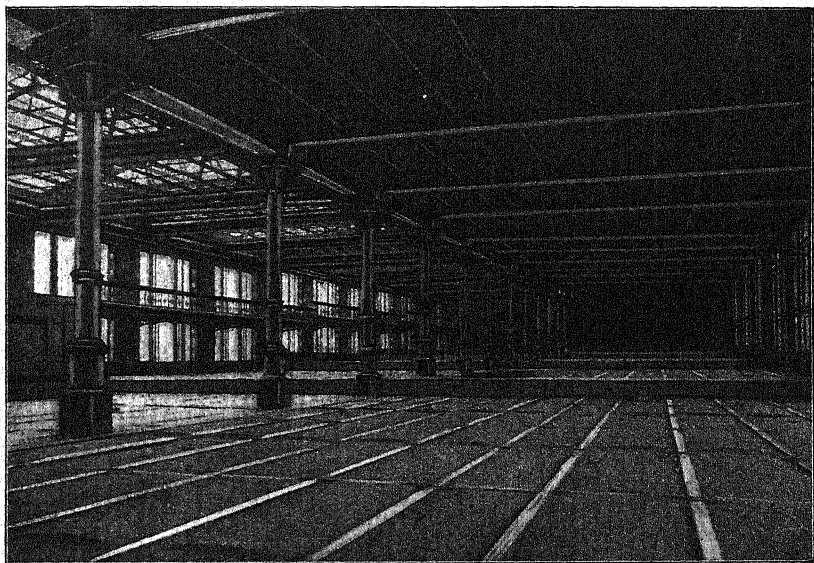


FIG. 117.—Royal Museum of Natural History, Brussels, Belgium. Large lower hall.

The large hall on the ground floor (to be devoted to the recent and fossil vertebrate animals of Belgium and its colonies) is 84.26 meters long, 30 meters wide, and 7.2 meters high. It will, however, be lengthened by 18 meters, so that the entire length of the building with the stairway hall in front will be 109 meters. The ceiling of this hall, in its entire width of 30 meters, is supported only by a central row of iron columns, of which there are 13, spaced 6.2 meters apart. Each half of the hall has, consequently, a clear, unobstructed width of 15 meters for the use of the collections—a width which, without columns, has been made use of in but few museums before the present day. Even permitting, as is proved in this instance, a superstructure of stories,^a

^aThe breadth of the hall in the Paris Anatomical Museum is 14 meters, without supporting columns.

museum halls of such a width ought not to be obstructed by columns, as is universally the case. On the window side of the hall with a double-glass roof there is a gallery 3.25 meters broad (in its first section still broader), intended for the cave finds, as well as for the living and fossil fishes of Belgium and its colonies. A similar gallery runs along the rear narrow side of the hall. The four sections of the floor and ceiling, which are of different elevations, are 24.8, 18.6, 18.6, and 21.8 meters long. In the second (intermediate) story are located for a length of 91.3 meters and a width of 15 meters, besides a stairway, hall, and two office rooms, 11 workrooms adjoining one another, each 9.8 meters long, 6.2 meters wide, and 4.75 meters high. At the rear end there are three library rooms of the same dimensions. In front of these rooms there is a corridor 3 meters wide and 3 meters high, from which anterooms (without windows) 2.2 meters wide and 3 meters high lead into the workrooms. In the third story, again, there is an exhibition hall 84.26 meters long and 15 meters wide, for the recent and fossil invertebrate animals, the fossil floras, the minerals, and precious stones of Belgium and its colonies. It has five different elevations, rising like steps, and on each level horizontal cases underneath are intended. Therefore there are about 400 running meters of horizontal cases in five series, rising one above the other, with longitudinal passages and crossways between, the latter with stairs. The ascending of this hall afforded sufficient extra space in the second (intermediate) story for workrooms. Its lighting is excellent; the long side at the foot of the step-like installation of horizontal cases is one combined glass window (glass partition wall). In addition, a row of upper windows on the opposite half of the roof throws light directly on these horizontal cases. The height of this hall varies between 2 and 7 meters, being 2 meters at the top and 7 meters at the foot of the step-like construction.

A better utilization of the space is hardly imaginable, and what should be particularly noticed is the fact that no superfluous space (nor likewise money) is expended on the stair hall, as is the case in most museums. This stair hall is built in front and not inside of the building, and is only 17 meters long and 7.1 meters deep. Each story is directly connected with the old museum.

I do not go into further detail on account of the unfinished condition of the building, but I would advise every architect who has a museum to design to scrutinize closely that of Brussels. It is a departure from every other structure of its kind because it is adapted to the original exhibition plan of the director. Mr. E. Dupont has throughout his entire life had in view the establishment of a Belgian national museum based on the researches that have been made in that country, so taking the national collections as a nucleus for this, he shaped his plans accordingly, the collections from other parts of

the world being utilized only so far as they are necessary to a proper understanding of this nucleus. With this in mind he has comprehensively arranged the researches according to a definite plan, and has recently included the Kongo State as Belgian. He regards the working up of the collections as a less important function of a museum than the procurement of the materials, in which latter respect he has been very successful, as is evidenced by the famous *Iguanodons* 8 meters high, 10 meters long, the fossil crocodiles, tortoises, sharks, whales, elephants, giant deer, rhinoceroses, etc. All of these, in addition to the extensive cave finds, will be installed in an intelligent way in the basement hall. In the rear portion of the hall of 84 meters length a herd of *Iguanodons* will be installed in many different positions, for which purpose the model is already prepared. As a parallel representation of animals now living, there will be shown a herd of elephants from the Kongo. The different elevations in the hall, rising by steps, will be utilized for separating the different epochs of the earth's history and the general view of the installation in this immense space promises to be most magnificent, provided it is not detracted from by the cases.

In view of the fact that the staff of seven museum experts must divide its time between exploring tours and the conduct of the museum, the assistance of outside experts, who are paid \$5 a day and traveling expenses, is obtained to identify and work up the collections. For this same purpose many specimens are sent out of the museum to receive attention. Scarcely any other natural history museum in the world is so uniformly planned and managed, but Mr. Dupont has been successful only after withstanding the greatest opposition and battling for decades. He insisted so firmly upon his well-considered plans that at one time for a year and a half his authority as director of the museum was suspended because he would not submit to the regulations promulgated by the minister. Finally, however, he carried his point. He also had a desperate struggle to reserve to himself the choice of the architect, who has constructed the museum entirely in accordance with his own personal directions. The cost of the building has been estimated at \$215,000, the cases, etc., \$40,000—remarkably small sums compared with the cost of construction of other museums.

The rooms of the old museum will later be used for the non-Belgian portions of the collections, but since they are manifestly not suited for museum purposes, the erection of a second new building is even now contemplated, for which purpose—which is of the greatest importance in the development of every museum—an abundance of space is available on the museum grounds. Little, however, can be said in praise of the present museum. The reconstruction of the monastery could have been better arranged so far as regards the lighting. The cases are those of the old museum, not answering modern requirements. The

installation is as a whole not attractive, but in many details worth imitating. The charts of geographical distribution, now found in many museums in the world, emanated from Brussels and have been elaborated here more than anywhere else. Especially noteworthy is the labeling and a large series of long descriptive and instructive placards. The minister at one time instructed the director to arrange for lectures in the museum for the benefit of the visiting public; the latter determined, however, to give these in the form of information on labels, arguing that in this way the information could be disseminated much more widely.

In this retired location the museum is visited annually by 80,000 persons; in the city formerly by 150,000. It is opened daily from 10 a. m. to 3 or 4 p. m., according to the time of the year—in my judgment, much too long a time for preserving the colors of the specimens.

For the prevention of fire, extinguishers are everywhere installed, known as the *Extincteur Instantané, Système Ad. Vandrooghenbroeck, Molenbeek-Bruxelles*.

The annual expenditures amount to \$31,750. Publications are issued as follows: *Annales* (10 volumes in folio up to 1896), *Bulletins* (7 volumes in octavo up to 1888), and *Mémoires* (since 1900 one volume in quarto).

It is not easy in a brief space to do justice to this original and uniquely organized museum.

43. BRIEF NOTES ON VARIOUS COLLECTIONS AND BUILDINGS.

I also visited in Brussels the House of the People (*Maison du Peuple*), designed by Horta, a remarkable, large, modern structure (completed in 1899) for the recreation and instruction of the working people, erected by themselves at a cost of \$160,000 and utilized also as a socialistic sales house. It is entirely modern in style, fireproof, and especially noteworthy on account of the interior iron construction of a hall, which accommodates 3,000 persons, used for assemblies, lectures, as a theater, and for concerts. It is artistically embellished, not in the style of a railway station, as is found in many museums—as, for instance, in the older part of the Metropolitan Museum of Art in New York, in the museums of Science and Art in Dublin and Edinburgh, and in the Natural History Museum of London, etc. Architects who build museums should inspect this hall.

The Royal Museum of Modern Painting (*Musée Royal de Peinture moderne*) is open daily from 10 a. m. to 3, 4, or 5 p. m., according to the time of the year. Its lighting is insufficient, as in many picture galleries. The great number of watchmen who were sleeping or entertaining themselves was noticeable, as also the marked lack of visitors.

The great Royal Museum of Ancient Paintings and of Sculpture (*Musée Royal de Peinture ancienne et de Sculpture*) made an excellent impression on me, with the exception that the halls are not well cared for.

I did not at this time examine any other institutions in Brussels, partly because they were already well known to me and partly because they were said not to be very important, as in the case of the Congo Museum in the somewhat distant Tervueren.

XV.—HANOVER.

44. PROVINCIAL MUSEUM.

The Provincial Museum is a new, rather large, and isolated museum, near a park, for which a public competition had taken place in 1896. It was not quite completed in October, 1901, but opened in February, 1902. It was constructed between 1897 and 1902 by H. Stier, in a modified, Italian high renaissance style, at a cost of more than \$500,000. The city contributed the site and \$137,500. It forms a rectangle 82 meters long and 61 meters wide, with its main front facing the southwest, the most favorable orientation for a building practically square; otherwise it is better to have the narrow sides face the south and the north. For this purpose the triangular site which was available, the main front being placed along its hypotenuse, would have been utilized to the best advantage if the right perpendicular (Plank street) had been taken as the principal axis. In this case, then, the form of the building would not have been shaped after general architectural principles, but only with regard to the collections to be housed. The three-storied building incloses a courtyard measuring 48 by 28 meters. The average width of the wings is 16 meters; the ground-floor story is 3.6 meters high; the second story 5.9, and the third story 6.5. On the ground floor and the second story there is throughout light from both sides (see ground plan of the latter floor in fig. 143); in the third story there are 11 rooms with light from one side and 11 rooms with skylight. The total height from the street level to the cornices, 16.2 meters; the four pavilions on the corners extending 4.45 meters above this, and the rotunda still 28.8 higher. The entrance hall on the ground floor is 9.5 high and 16 meters square with a branching stairway to the second story, where again there is a large hall (with cupola) 16 meters square—the main hall of the museum.

The building is of fireproof construction throughout, except the cupola, which is of wood (for economy's sake). The roofs, however, are covered with copper sheets with iron bands and purlins. The exterior walls are of sandstone and tufa, with granite water tables; the carved ornamentation of the main front is of limestone; the sides facing the courtyard are cemented and painted with amphiboline color, and the

cornice and window sills are of sandstone. For the interior cast-iron columns and beams are employed, covered throughout with terra cotta and siliceous marl. The floor is made of xylopal (sawdust with white cement), supplied by Kühl & Miethe, in Hamburg, which is applied moist upon the surface of a concrete foundation; it has a yellow tint and is elastic. In both halls and in some of the other rooms terrazzo combined with linoleum is employed. As shown in fig. 120, which represents a room in the second story, the interior decoration is simple except for the capitals, etc., which are more richly ornamented; ceilings and walls painted with light lime color. There is steam heating and no ventilating apparatus.

The building cost \$6.50 for each cubic meter of built space; the foundation, \$54,500, or \$13.50 for each square meter, there being approximately 3,900 square meters. The new fixtures cost \$14,000.

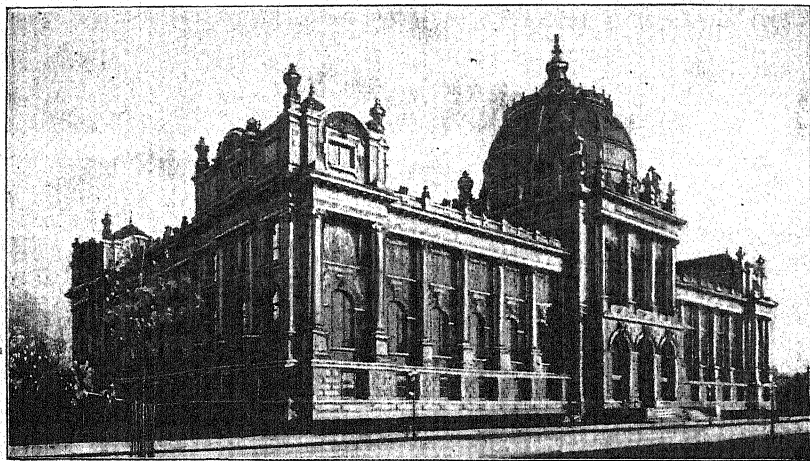


FIG. 118.—Provincial Museum, Hanover, Germany.

I take these details from the readable and comprehensive description by the architect in the *Zeitschrift für Architektur und Ingenieurwesen*, 1902, Part I, 18 half pages, with four plates and five text figures, quarto.

For a provincial museum this is a most noticeable work and much may be learned from it. The building had to serve for collections of all kinds, for art and science, ecclesiastical antiquities, mediæval art objects, sculptures, paintings, coins, ethnography, archeology, zoology, paleontology, botany, mineralogy, etc., and contains also as a conspicuous exhibit the so-called "Guelph" museum, which is held in trust by the joint house of Brunswick-Lüneburg. It was necessary in designing the building to make it meet the most varied needs, and on that account the architect imitated famous models, avoiding, however, above all things, insufficient lighting, which is so often found. All

the rooms are light except the basement, which was properly not intended for collections, but which, on account of the necessity for abridging the original plans, for reasons of economy, had to be devoted to this purpose. Thus the ethnographic and prehistoric collection there exhibited is quite inadequately lighted. Only on the southeast and southwest sides may disadvantages arise from too much sun. The partition of the third story into 22 small rooms is not altogether advantageous, the natural sciences being crowded thereby. In addition, in this department, for economical reasons, old cases were used as well as new ones made after an entirely antiquated pattern, although good examples were at hand nearby in the collections of the veterinary

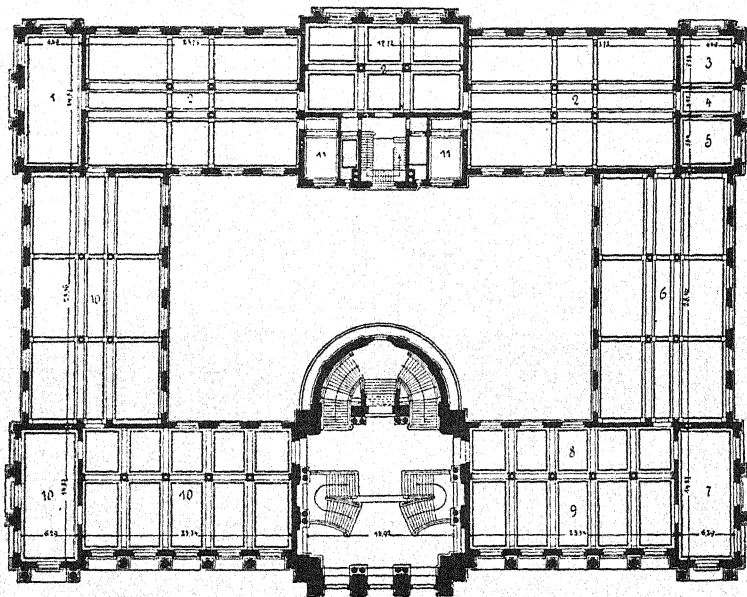


FIG. 119.—Provincial Museum, Hanover, Germany. Plan of second story: 1, coins and seals; 2, historic antiquities; 3, director; 4, anteroom; 5, library; 6, paleontology; 7, herbarium; 8, petrography; 9, mineralogy; 10, sculpture; 11, workroom.

high school. The columns and beams of the second story are not adapted to the dimensions of the rooms and look heavy. Whether the columns could not have been omitted altogether in rooms of this limited width is a question well worthy of consideration. In the Brussels Museum we learned of a hall 30 meters wide with only one row of columns in the center (see above), a span, therefore, of 15 meters, while the rooms of this provincial museum are only 14 to 15 meters wide.^a

As fig. 118 shows, much money has been spent in the artistic exterior decoration of the building, and not less for its two large halls,

^a The ground-floor hall in the Galeries d'Anatomie in the Botanical Gardens in Paris also has a width of span of 14 meters without columns.

on which account it was necessary to make the building smaller than was originally planned and demanded by the extent of the collections, therefore it became impossible to install the natural science collections according to modern requirements. Besides, the form of the entire structure admits of no extension. Though the building is only just completed, the builder already calls attention, in his description, to the fact that the natural-history collections must have a separate building! No provision has been made for the introduction of dust-free air into the museum, therefore the most recent important improvements in this direction have not been considered. As the museum, when I inspected it, was not entirely completed, I am not in

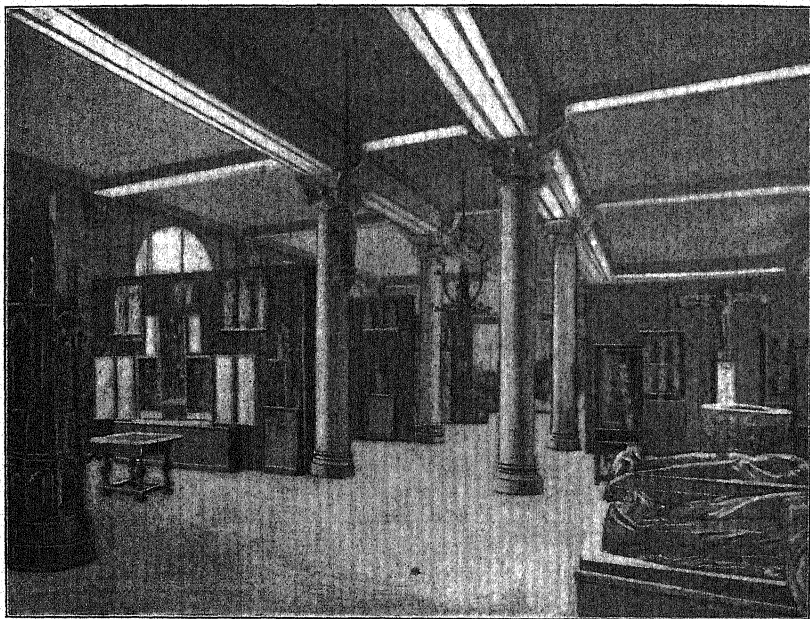


FIG. 120.—Provincial Museum, Hanover, Germany. A room on the second story.

a position to express a final opinion regarding it, though I believe that here, in conjunction with some undesirable features, much that is good is to be found.

45. VETERINARY HIGH SCHOOL: TECHNICAL HIGH SCHOOL.

The Veterinary High School (Tierärztliche Hochschule) is a large, only recently completed building in a group of single houses. The annual expenditures are \$32,500. There are about 300 students and 17 teachers. I confined my attention to the anatomical institute, where there is a museum which is good but offers nothing extraordinary, as there was only a limited sum available for the building and as there

likewise is for its maintenance. In the large, light, clean dissecting hall is such an effective ventilating apparatus that when it is set in operation, as required, it obviates all odors. The iron cases containing the collection, located in well-lighted halls, are of the Dresden pattern, although not of the most improved type.

The Technical High School (annual expenditure \$125,000), whose mineralogical collection I visited, possessed nothing worthy of mention from a technical-museum standpoint.

CONCLUSION.

In reviewing all these experiences of travel—to make clear what there was new to learn, independent of old and well-known matters, especially in connection with the building of a new museum in Dresden—I note particularly two things that deserve especial mention:

(1) The new ventilating and heating methods employed in the museums of Liverpool and Glasgow, originating contemporaneously though independently of each other, and also installed in the technical schools in Manchester and Liverpool, as well as in the Rylands Library in Manchester, elsewhere in use only in America—has hitherto been entirely disregarded in Germany, so far as I know; and

(2) The plan of construction of the new Brussels Natural History Museum, which, being accurately adapted to certain special purposes, ought not to be copied without modifications, is very instructive and worthy of imitation as respects its lighting and utilization of space, and also as regards its low cost, which has not, however, been allowed to detract from its pleasing effect. It, therefore, appears to be most noteworthy.

In general, notwithstanding the shortcomings that attach to most human things, the Natural History Museum and the Museum of the Royal College of Surgeons in London remain in many respects at the head as models in the line of technic of natural science museums and in the scientific usefulness of the collections. There is probably no museum official who has not learned more in those museums than everywhere else. The method of installation in the Ethnographic Museum in Oxford is unique in its way, and in a high degree suggestive and instructive. The Rylands Library, in Manchester, remains, notwithstanding its many shortcomings as a library building, a magnificent jewel box. Finally, the Galeries d'Anatomie in the Jardin des Plantes in Paris is a most remarkable production, not only as a museum structure, but also as an example of the art of exhibition, particularly the ground floor, on account of its excellent lighting and the simplicity of its plan.

Although I particularize in these several respects in concluding this paper, I do not wish to cast in the background the many other good things that I have already mentioned in their place and for which I

refer the kind reader to the several chapters. On the other hand, notwithstanding all the good that I saw, the opinion forces itself upon me—and I do not wish to conceal it—that, taken as a whole, the art of constructing natural science museums is still in its infancy. In most cases such museums are defectively planned, and it is only exceptionally that we meet with beginnings that may be considered as the dawn of a new era in this field of human endeavor. Then, too, the art of the interior installation of such museums is, in general, still in a very bad state. The principal reasons for this appear to me to be that, on the one hand, whatever is displayed in a prominent locality is imitated without judgment and without wishing at all to better it, and on the other hand, attempts are made quite independently, without any effort to profit by the experience of others in such matters. In most cases, also, plans for natural science museums are carried out too rapidly. A new building is determined upon, money is available for its construction, and then sufficient time is not devoted to properly preparing the plans in advance—presently a plan is selected and all of its shortcomings must be taken with it. With regard to the interior furnishing, however, the conditions are still worse. Usually the building has cost more money than was anticipated and economy must then be exercised in the interior furnishing. Although this is no less essential, yet much too little importance is attached nearly everywhere to the interior installations, and far too slight deliberation is bestowed upon them.

I am convinced that the natural science museum of the distant future will be very different from that of the present, often very inadequate, attempts. On the other hand, art museums have already advanced to a much higher stage of progress, due perhaps to the fact that their contents are not so varied and that consequently the problems to be solved do not present such difficulties.

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